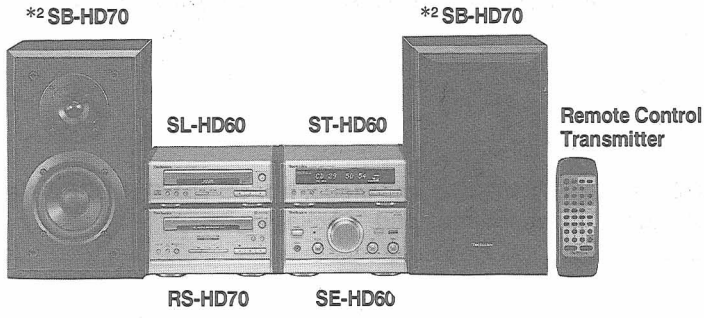
ORDER NO. AD9702020C2

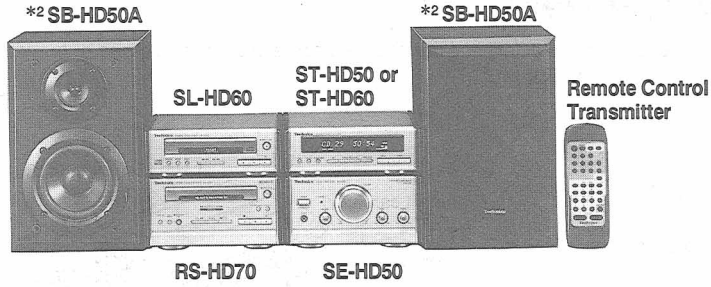
Service Manual

CD Player

System: SC-HD60



System: SC-HD50



CD Player

SL-HD60

Colour
(N) ..... Gold

Areas
(E)/(EP) ..... Europe, Russia.

COMPACT disc DIGITAL AUDIO

MASH*1 multi-stage noise shaping

Because of unique interconnecting cables, when a compact requires service, send or bring in the entire system.

*2

System	Areas	Tuner
SC-HD50	(Germany. Italy.)	: ST-HD60
SC-HD50	(Europe. Russia.)	: ST-HD50

Specifications

Audio

DA converter: 1 bit 2 DAC MASH *1

Pickup

Wavelength: 780 nm

General

Dimensions: 196(W)/67(H)/228(D) mm
Weight: 1.3 kg

Notes:
Specifications are subject to change without notice.
Weight and dimensions are approximate.

*1 MASH is a trademark of NTT

System/SC-HD60:
Tuner: ST-HD60, **Compact Disc Player: SL-HD60**, Amplifier: SE-HD60, Cassette Deck: RS-HD70, Speakers: SB-HD70

System/SC-HD50:
Tuner: ST-HD50 or ST-HD60, **Compact Disc Player: SL-HD60**, Amplifier: SE-HD50, Cassette Deck: RS-HD70, Speakers: SB-HD50A

Notes: *2 ..... Made in PAES

⚠WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

Technics®

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NOTE:
Refer to the service manual for Model No. SE-HD60 (ORDER No. AD9701022C2) and Model No. SE-HD50 (ORDER No. AD9701017C2) for information on "Accessories", "Installation", "Connections" and "Packaging".

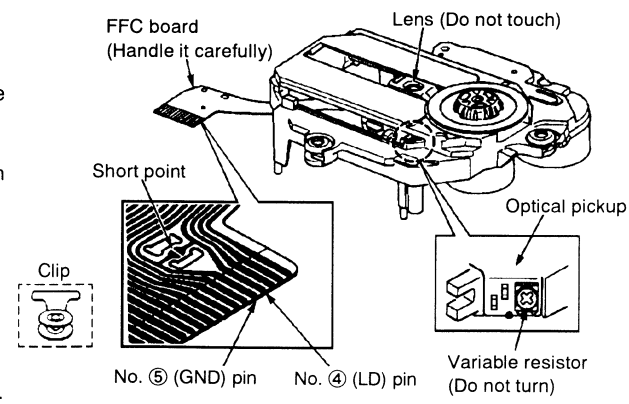
CAUTION:
THIS PRODUCT UTILIZES A LASER.
USE OF CONTROLS OR ADJUSTMENTS OR PERFORMANCE OF PROCEDURES OTHER THAN THOSE SPECIFIED HEREIN MAY RESULT IN HAZARDOUS RADIATION EXPOSURE.

■ Handling Precautions for Traverse Deck

The laser diode in the traverse deck (optical pickup) may break down due to potential difference caused by static electricity of clothes or human body. So, be careful of electrostatic breakdown during repair of the traverse deck (optical pickup).

• Handling of traverse deck (optical pickup)

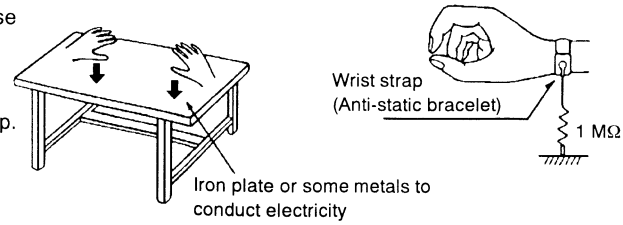
1. Do not subject the traverse deck (optical pickup) to static electricity as it is extremely sensitive to electrical shock.
2. To protect the laser diode against electrostatic breakdown, short the flexible board (FFC board) with a clip or similar object.
3. Take care not to apply excessive stress to the flexible board (FFC board).
4. Do not turn the variable resistor (laser power adjustment). It has already been adjusted.



• Grounding for electrostatic breakdown prevention

1. Human body grounding
   Use the anti-static wrist strap to discharge the static electricity from your body.
2. Work table grounding
   Put a conducive material (sheet) or steel sheet on the area where the traverse deck (optical pickup) is placed, and ground the sheet.

Caution:
The static electricity of your clothes will not be grounded through the wrist strap. So, take care not to let your clothes touch the traverse deck (optical pickup).



Caution when Replacing the Traverse Deck:

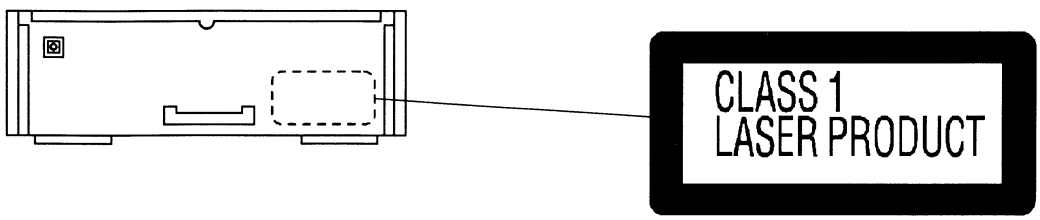
The traverse deck has a short point shorted with solder to protect the laser diode against electrostatic breakdown. Be sure to remove the solder from the short point before making connections.

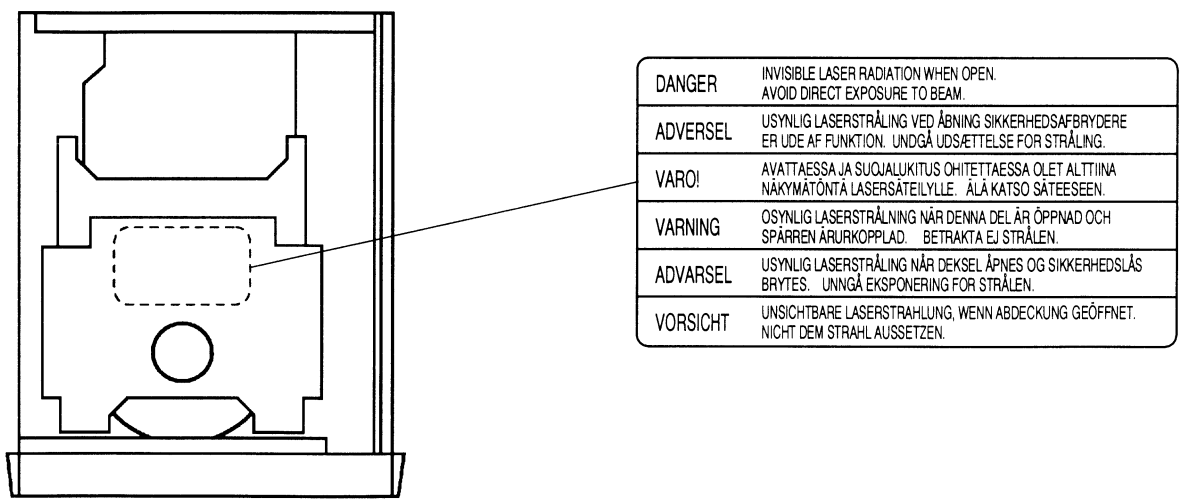
■ Precaution of Laser Diode

CAUTION: This product utilizes a laser diode with the unit turned "on", invisible laser radiation is emitted from the pick up lens.
Wave length: 780 nm
Maximum output radiation power from pick up: 100 μW/VDE

Laser radiation from the pick up unit is safety level, but be sure the followings:

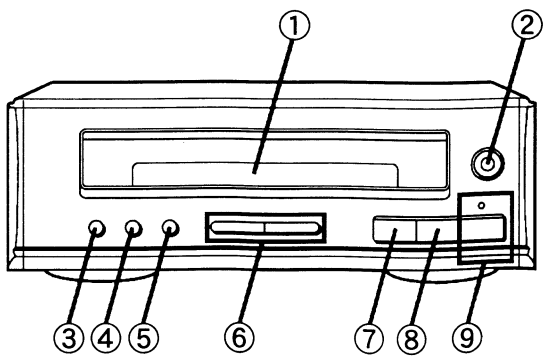
1. Do not disassemble the pick up unit, since radiation from exposed laser diode is dangerous.
2. Do not adjust the variable resistor on the pick up unit. It was already adjusted.
3. Do not lock at the focus lens using optical instruments.
4. Recommend not to lock at pick up lens for a long time.





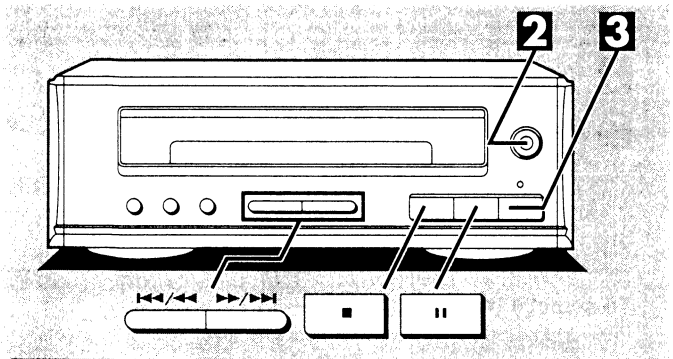
DANGER	INVISIBLE LASER RADIATION WHEN OPEN. AVOID DIRECT EXPOSURE TO BEAM.
ADVERSEL	USYNLIG LASERSTRÅLING VED ÅBNING SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION. UNDGÅ UDSÆTTELSE FOR STRÅLING.
VARO!	AVATTAESSA JA SUOJALUKITUS OHITETTAESSA OLET ALTTIINA NÄKYMÄTÖNTÄ LASERSÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN.
VARNING	OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD OCH SPÄRREN ÄRURKOPPLAD. BETRAKTA EJ STRÅLEN.
ADVARSEL	USYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNES OG SIKKERHEDSLÅS BRYTES. UNNGÅ EKSPONERING FOR STRÅLEN.
VORSICHT	UNSICHTBARE LASERSTRAHLUNG, WENN ABDECKUNG GEÖFFNET. NICHT DEM STRAHL AUSSETZEN.

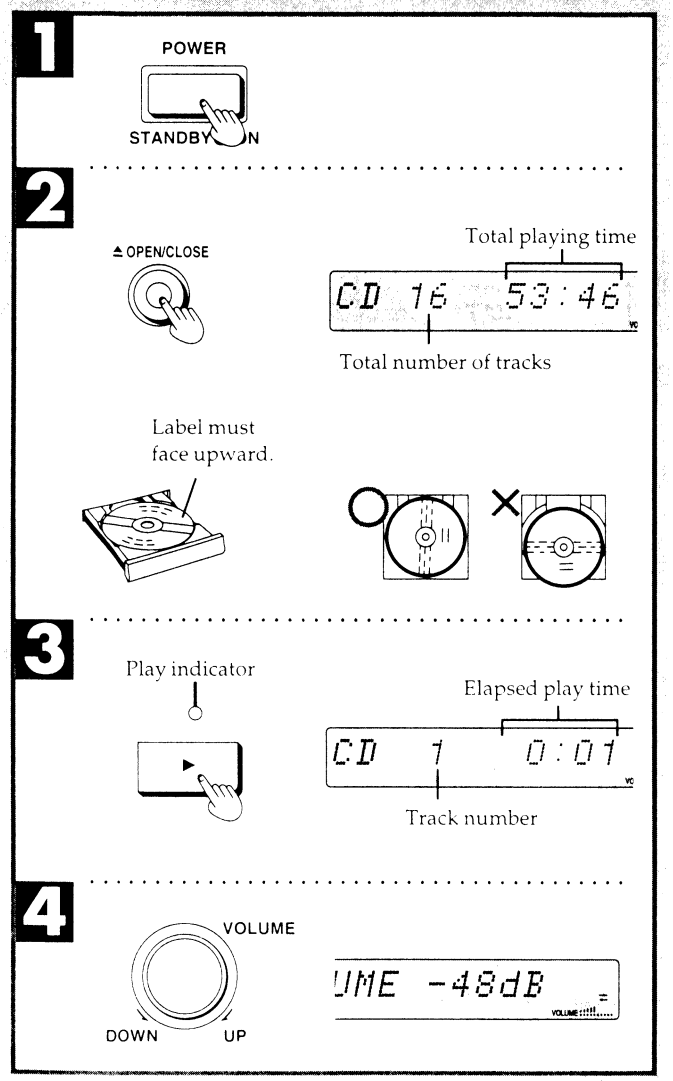
■ Location of Controls

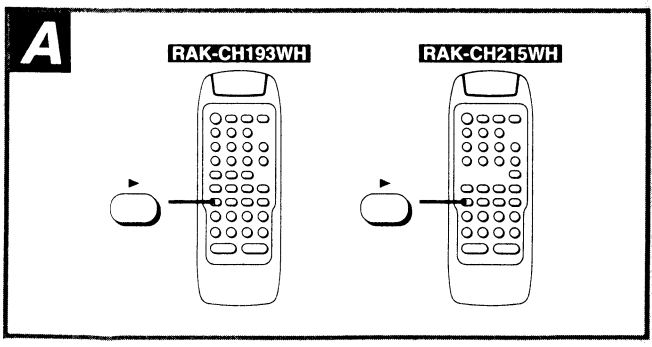


① Disc tray
② Disc tray open/close button (⏏ OPEN/CLOSE)
③ Random play button (RANDOM)
④ Repeat button (REPEAT)
⑤ AI edit button (AI EDIT)
⑥ Skip/search buttons (⏮/◀◀, ▶▶/⏭)
⑦ Stop button (■)
⑧ Pause button (❚❚)
⑨ Play button and indicator (▶)

■ Listening to Compact Disc







Sequential play

1 Switch on the power.

2 Press ≜ OPEN/CLOSE to open the tray. Set a CD on the tray.

Press ≜ OPEN/CLOSE once again to close the tray.

When the "CD" input source is selected, total number of tracks and total playing time will appear on the display.

Note

The total playing time displayed when a disc is loaded includes intervals between tracks. This is why sometimes the displayed time is longer than that listed on the CD.

3 Press ►.

Play will start from the first track, and will stop automatically when the last track is finished.

4 Adjust the volume level as you like.

To stop the disc play:

Press ■.

To temporarily stop the disc play:

Press II. The play indicator flashes up green.
To play again, press ►.

When "CD NO DISC" display appears:

It indicates that a CD has not been inserted in the tray.

About play indicator:

While stopped: Lights up orange.
While playing: Lights up green.

For your reference:

If you press ► instead of ≜ OPEN/CLOSE after setting a CD, the tray will close and play will start directly from the track 1.

To search forward/backward:

Available only from the main unit

Hold down I◄◄/◄◄ or ►►/►►I during playback.
►►/►►I: To search forward
I◄◄/◄◄: To search backward

To skip forward/backward:

Press I◄◄/◄◄ or ►►/►►I.
►►/►►I: To skip forward
I◄◄/◄◄: To skip backward

Note

During random play, you can not skip to tracks which have already been played out. (page 18)

For your reference:

- During program play or random play, you can search-forward/backward only within the current track. (pages 18 and 19)
- During program play, skipping is always in the programmed order, whether forward or backward. (page 19)

One-touch play A

When the system is OFF, playing starts automatically when you press ► on the remote control.
The play will start with volume increasing gradually.

Note

Do not use CDs with poorly attached labels or stickers.
Adhesive protruding from underneath stickers or left over from peeled off stickers can cause your system to malfunction.

■ Operation Checks and Main Component Replacement Procedures

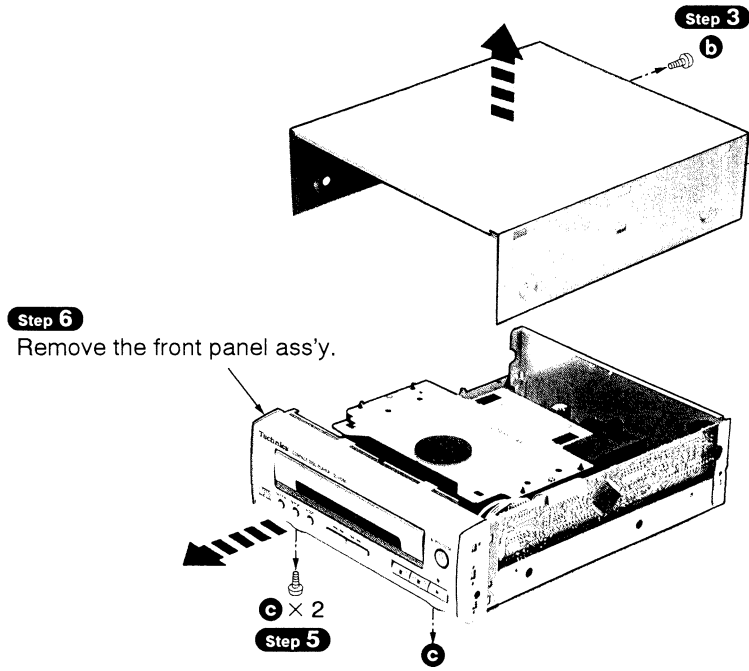
NOTE

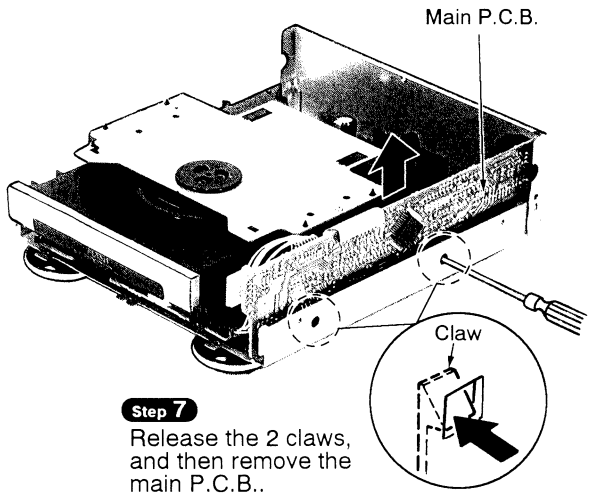
1. **This section describes procedures for checking the operation of the major printed circuit boards and replacing the main components.**
2. **For reassembly after operation checks or replacement, reverse the respective procedures. Special reassembly procedures are described only when required.**
3. **Select items from the following index when checks or replacement are required.**
4. **Refer the parts No. on the page of "Main component Replacement Procedures", if necessary.**

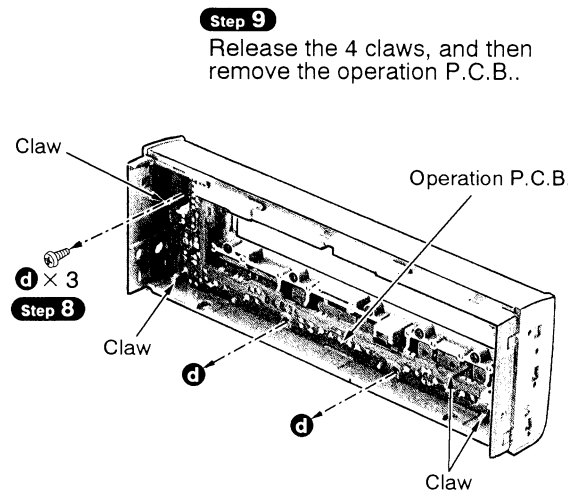
• Contents

• Checking Procedure for each P.C.B. Page.

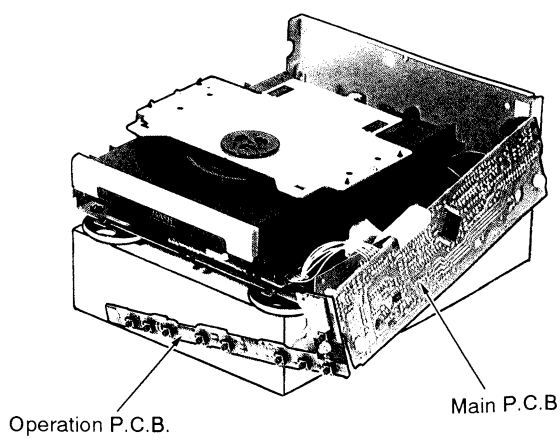
1.Checking for the main P.C.B.. • • •





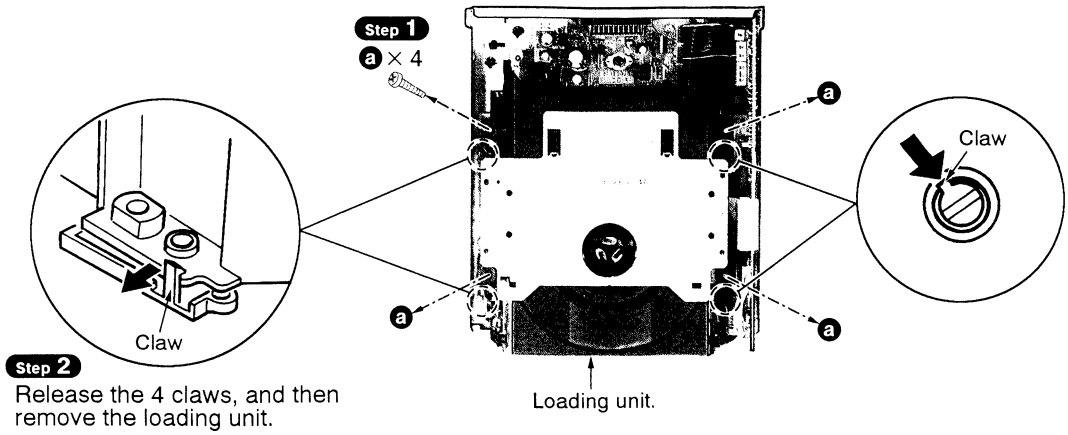


• Check the main P.C.B. as shown below.

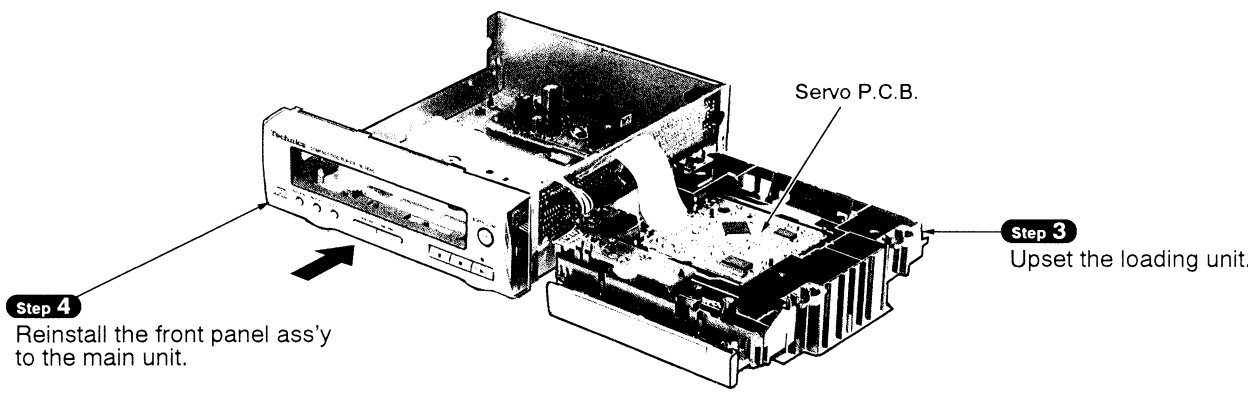


2. Checking for the servo P.C.B.

• Follow the Step 1 ~ Step 6 of the item 1 in checking procedure for each P.C.B. on pages 5 and 6.



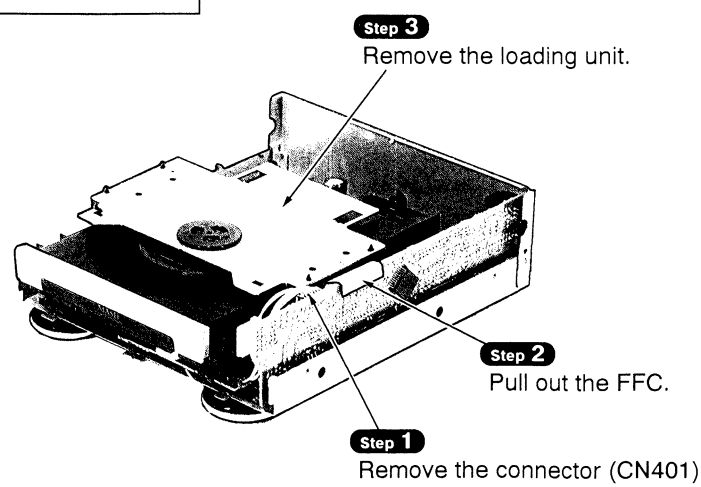
• Check the servo P.C.B. as shown below.

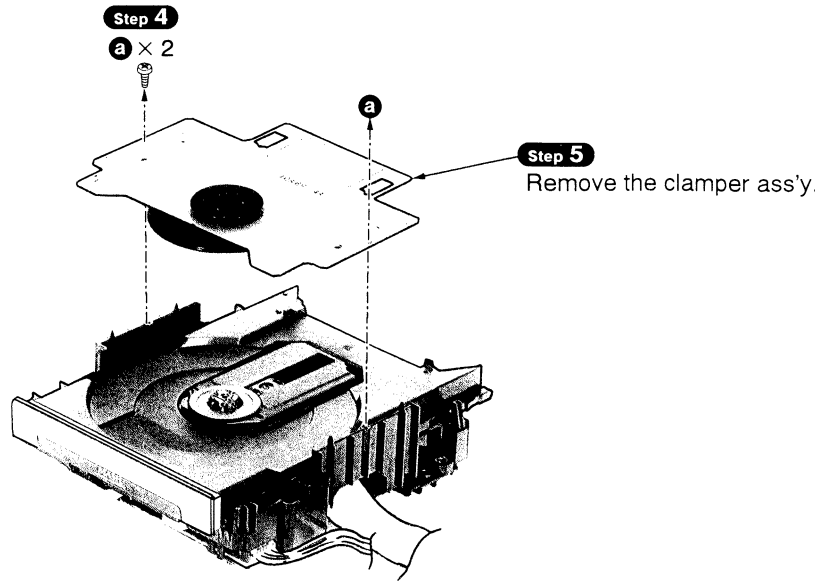


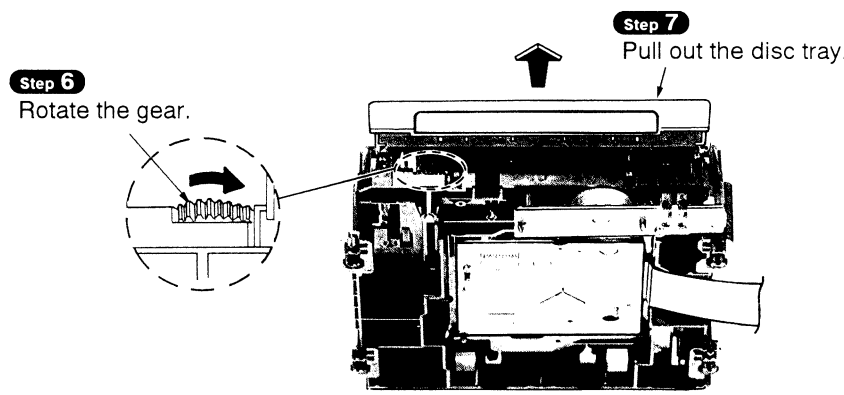
■ Main Component Replacement Procedures

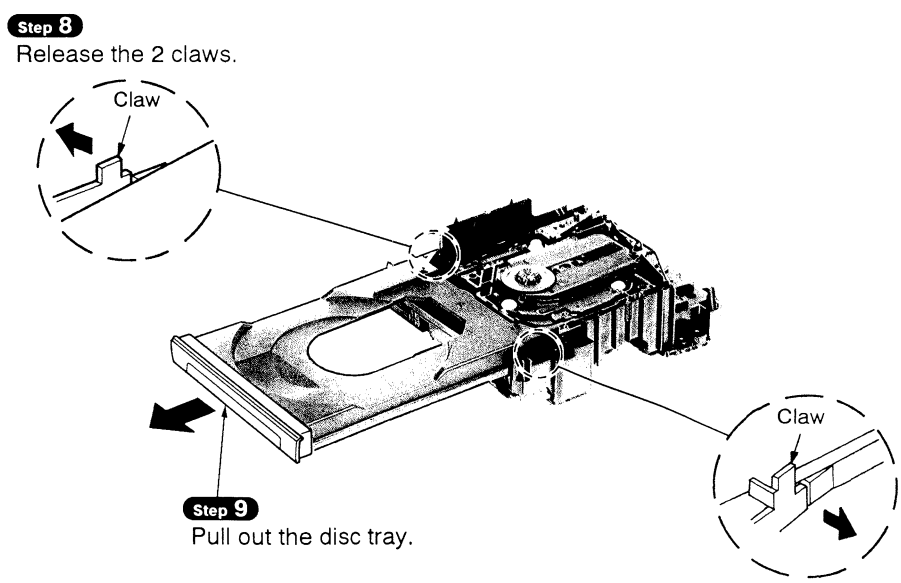
1. Replacement for the traverse deck ass'y

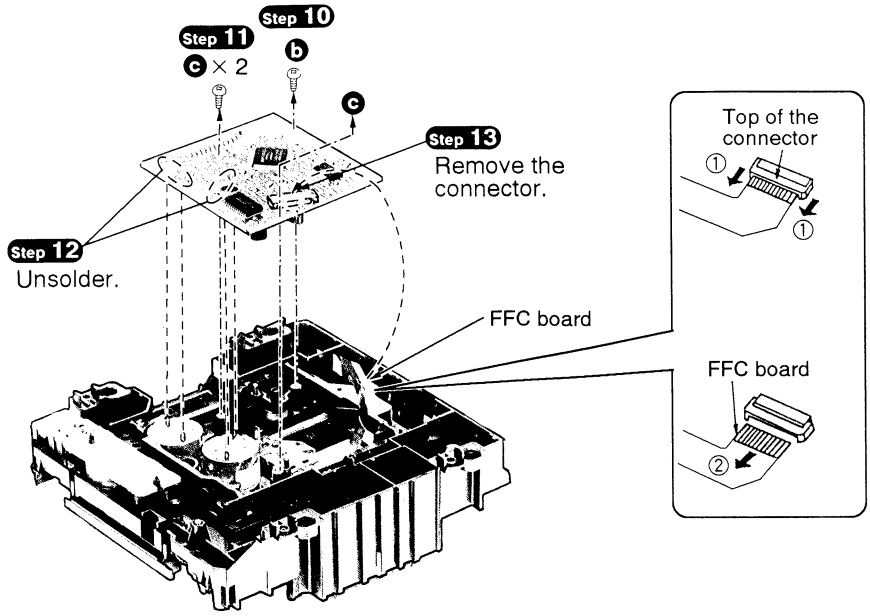
• Follow the Step 1 ~ Step 6 of the item 1 in checking procedure for each P.C.B. on pages 5 and 6.
• Follow the Step 1 , Step 2 of the item 2 in checking procedure for each P.C.B. on page 7.



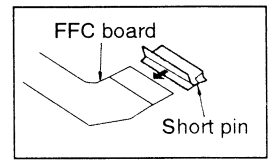

Step 4
ⓐ × 2
ⓐ
Step 5
Remove the clamper ass'y.

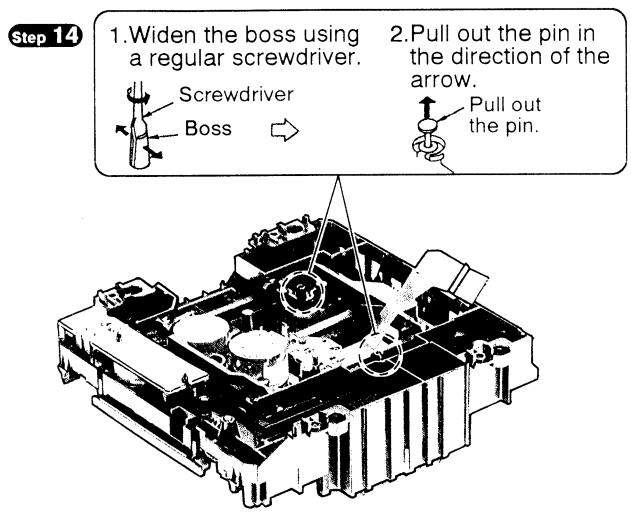

Step 7
Pull out the disc tray.
Step 6
Rotate the gear.

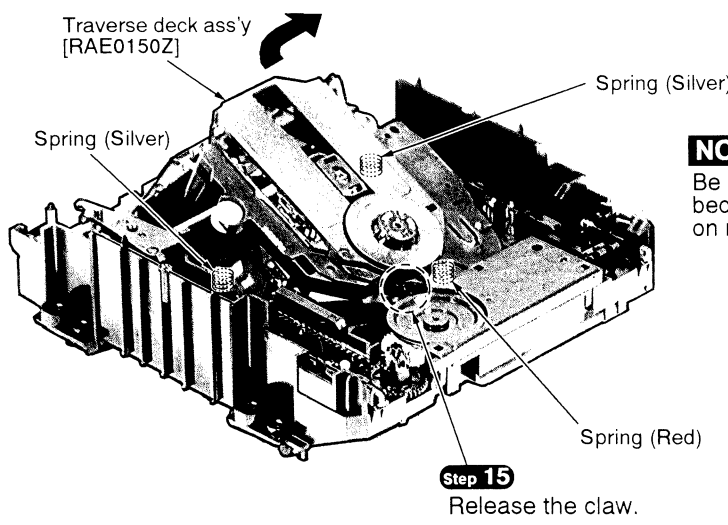

Step 8
Release the 2 claws.
Claw
Claw
Step 9
Pull out the disc tray.



Caution:
Insert a short pin into the traverse unit FFC board.
(Refer to "Handling Precautions for Traverse Deck" on page 2.)



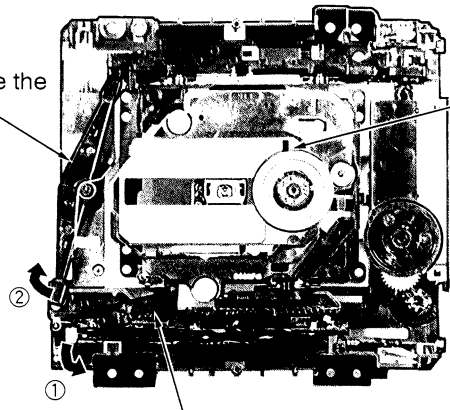

Step 14
1.Widen the boss using a regular screwdriver.
Screwdriver
Boss
2.Pull out the pin in the direction of the arrow.
Pull out the pin.



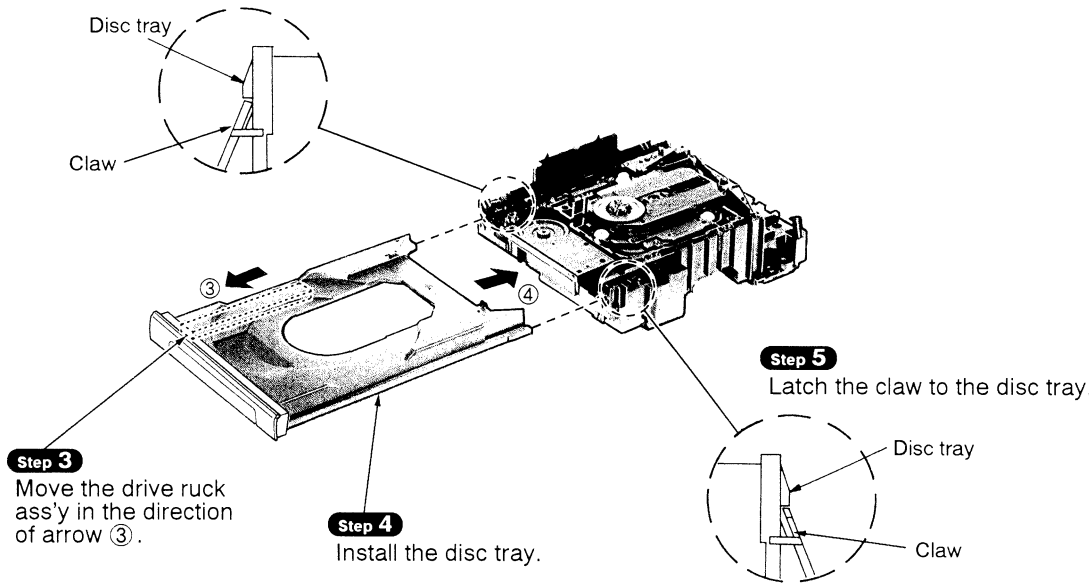
NOTE
Be careful not to lose the 3 springs because those will also be removed on removal of the traverse deck ass'y.

Installation of the disc tray after replacement

Step 2
Operate the lever, and then locate the traverse deck to "UP" position.



Step 1
Release the lock lever.

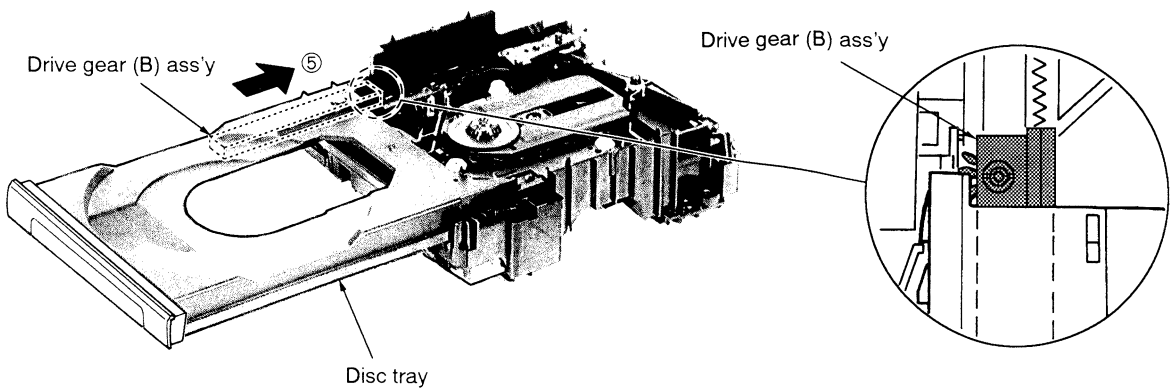


Step 3
Move the drive ruck ass'y in the direction of arrow ③.

Step 4
Install the disc tray.

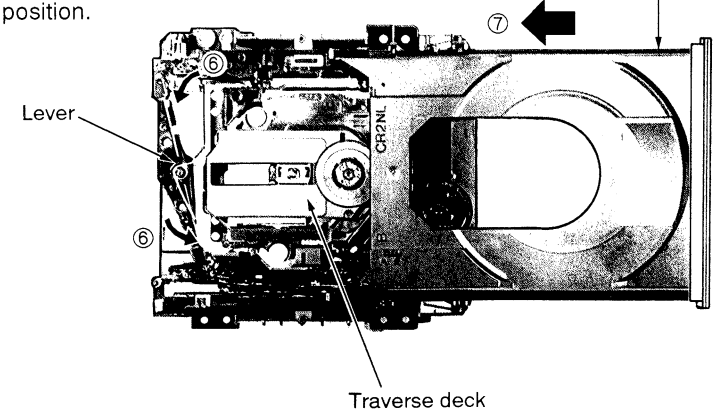
Step 5
Latch the claw to the disc tray.

Step 6
Supporting the disc tray manually, engage the drive gear (B) ass'y with the gear and then slide to stop the disc tray.

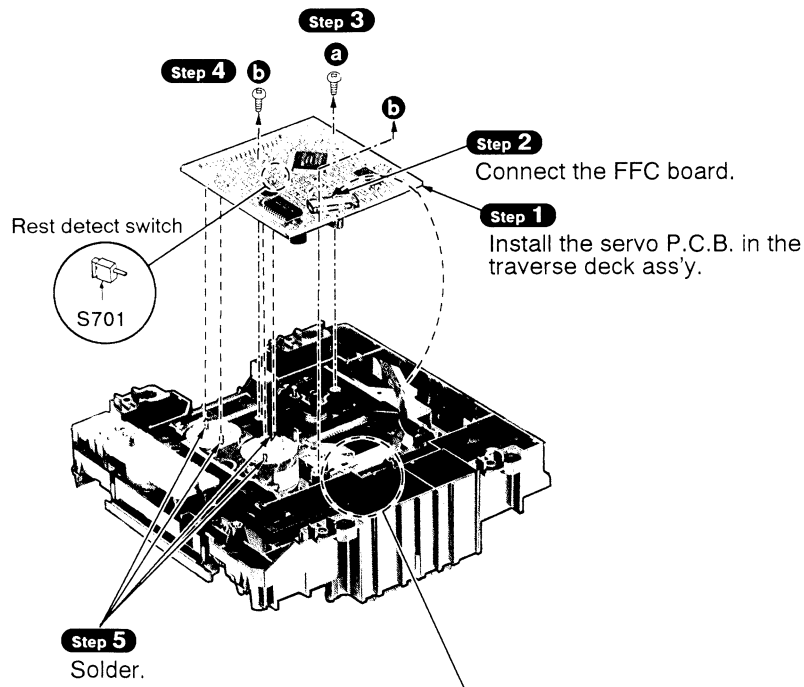


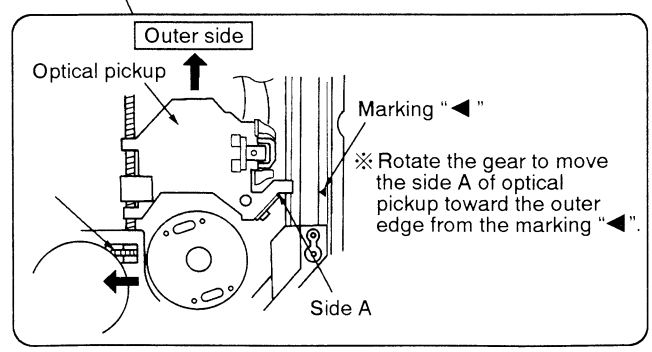
Step 7
Operate the lever, and then locate the traverse deck to "DOWN" position.

Step 8
Press the disc tray.



Installation of the servo P.C.B. after replacement

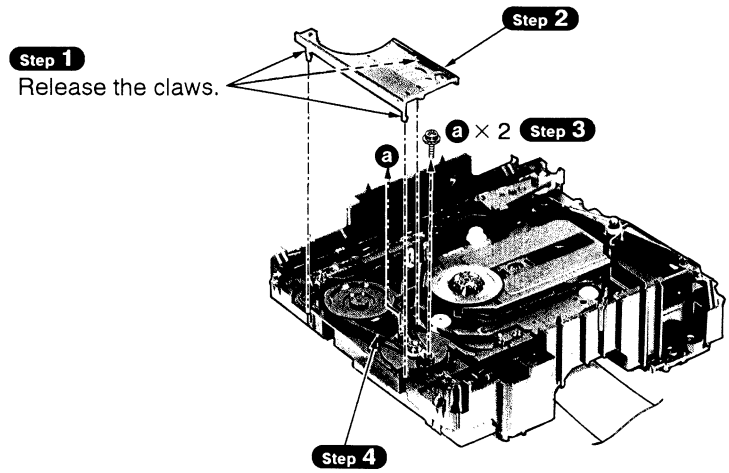



Outer side
Optical pickup
Marking "◀"
※ Rotate the gear to move the side A of optical pickup toward the outer edge from the marking "◀".
Side A

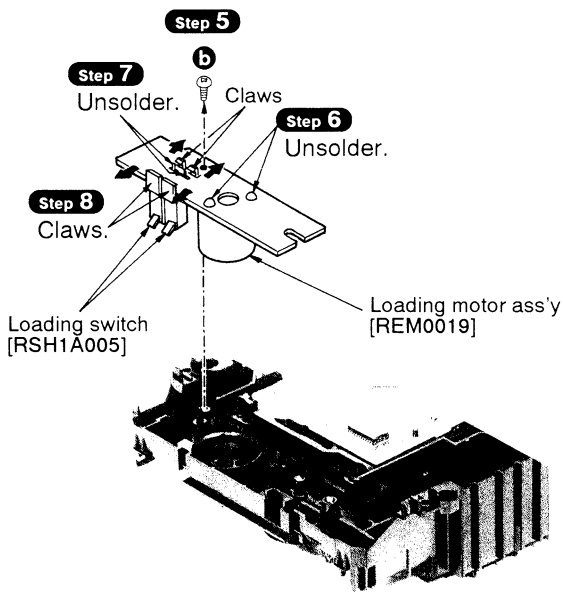
NOTE
Before installing the servo P.C.B., move the optical pickup toward the outer edge from the mark "◀". [Otherwise, the rest detect switch (S701) mounted on the servo P.C.B. may be damaged.]

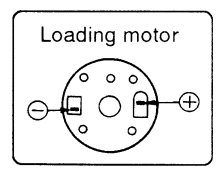
2. Replacement for the belt, loading motor ass'y and loading switch

- Follow the Step 1 ~ Step 6 of the item 1 in checking procedure for each P.C.B. on pages 5 and 6.
- Follow the Step 1 , Step 2 of the item 2 in checking procedure for each P.C.B. on page 7.
- Follow the Step 1 ~ Step 9 of the item 1 in main component procedures on pages 7 and 8.



Remove the belt [RMG0158].





■Schematic Diagram

Page

A SERVO CIRCUIT 14, 15
B LOADING MOTOR CIRCUIT 16
C MAIN CIRCUIT 16, 17
D OPERATION CIRCUIT 16
E POWER SUPPLY CIRCUIT 17

● This schematic diagram may be modified at any time with the development of new technology.

Notes:

- **S701** : Rest detect switch in "OFF" position
- **S790** : Tray open detect switch in "OFF" position
- **S791** : Tray close detect switch in "OFF" position
- **S801** : Tray open/close detect switch (⏏ OPEN/CLOSE) in "OPEN" position
- **S802** : Pause switch (❚❚)
- **S803** : F. Skip/Search switch (▶▶/▶▶❙)
- **S804** : Play switch (▶)
- **S805** : Stop switch (■)
- **S806** : R. Skip/Search switch (❙◀◀/◀◀)
- **S807** : Random play switch (RANDOM)
- **S808** : AI edit switch (AI EDIT)
- **S809** : Repeat switch (REPEAT)

● Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.

No mark : CD STOP
( ) : CD PLAY [1kHz, L + R, 0 dB]

● Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety.
Furthermore, special parts which have purposes of fire-retardant (resistors), high-quality sound (capacitors), low-noise (resistors), etc. are used. When replacing any of components, be sure to use only manufacturer's specified parts shown in the parts list.

● **Caution!**
IC and LSI are sensitive to static electricity.
Secondary trouble can be prevented by taking care during repair.
Cover the parts boxes made of plastics with aluminum foil.
Ground the soldering iron.
Put a conductive mat on the work table.
Do not touch the legs of IC or LSI with the fingers directly.

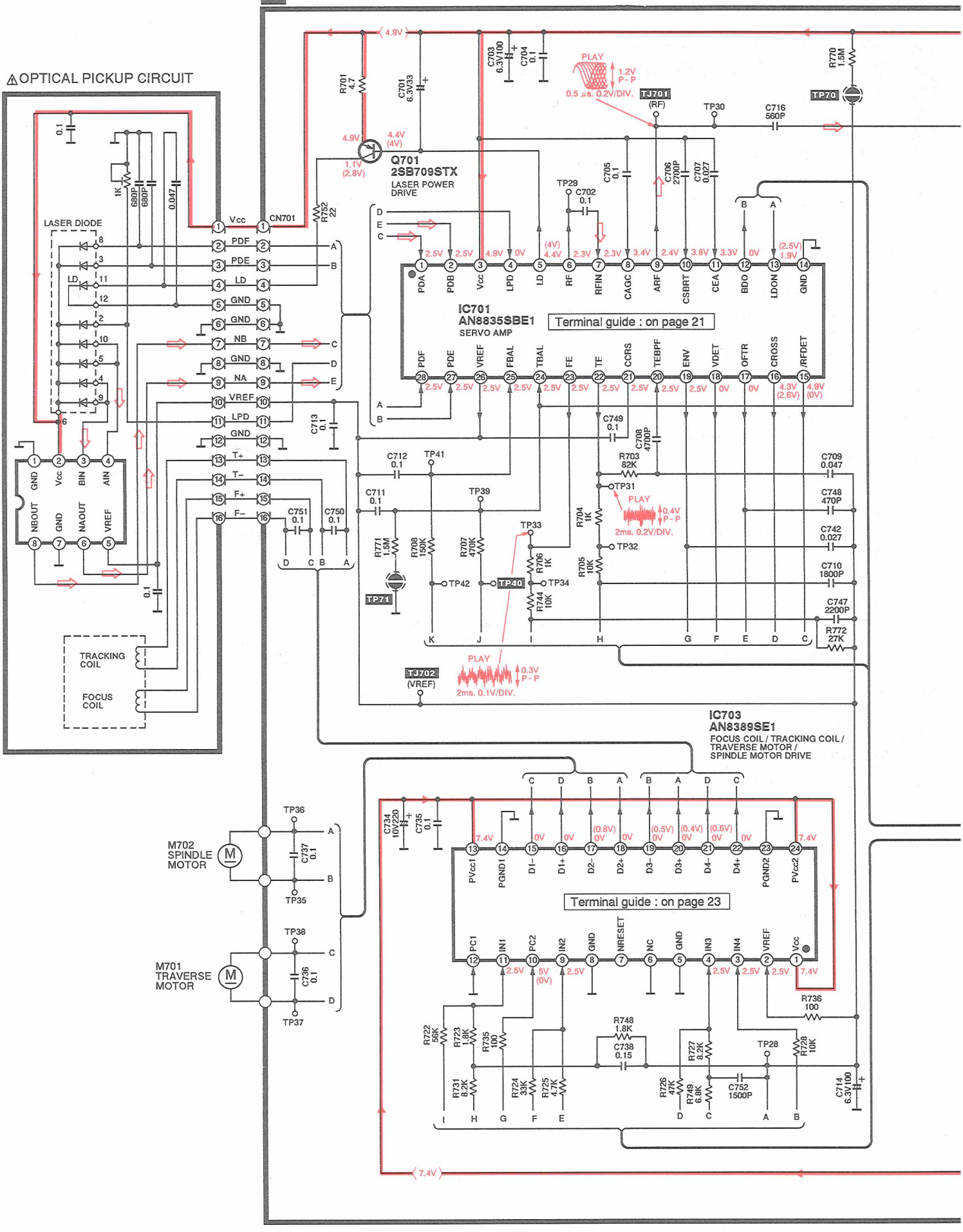
● **Voltage and signal line**

: Positive voltage line

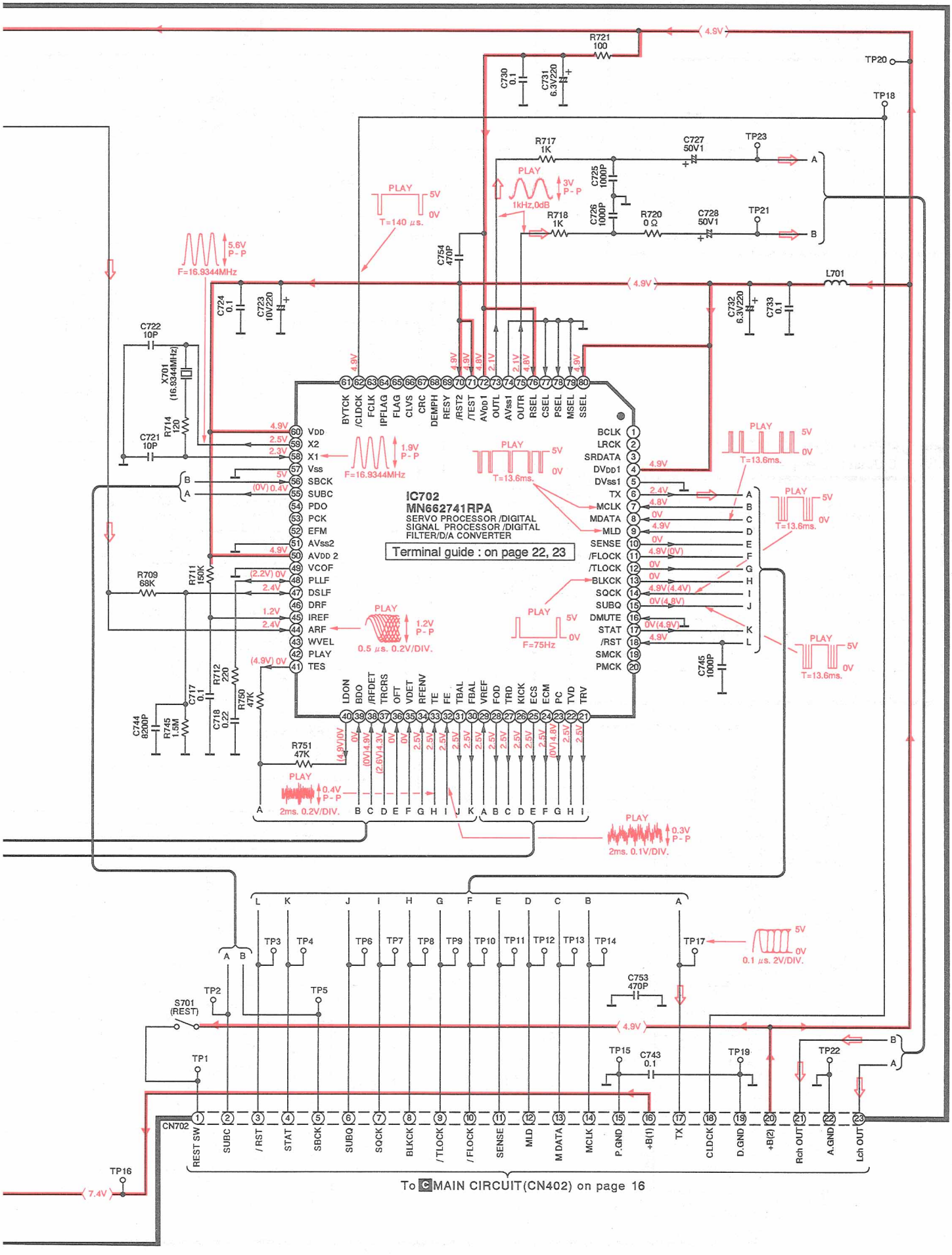
: Negative signal line

: CD signal line

A SERVO CIRCUIT (P.C.Board:on page 19)



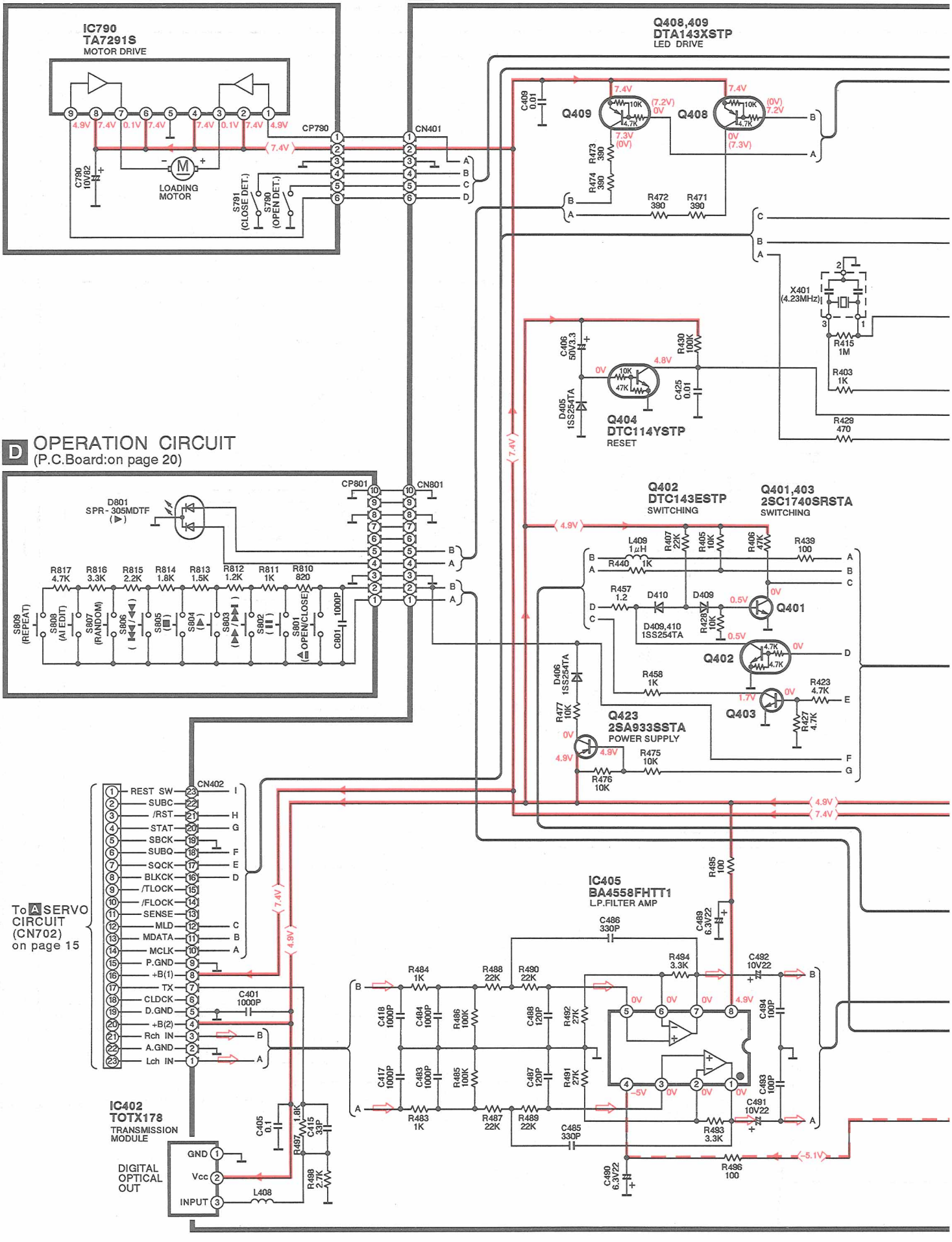
: Positive voltage line : CD signal line



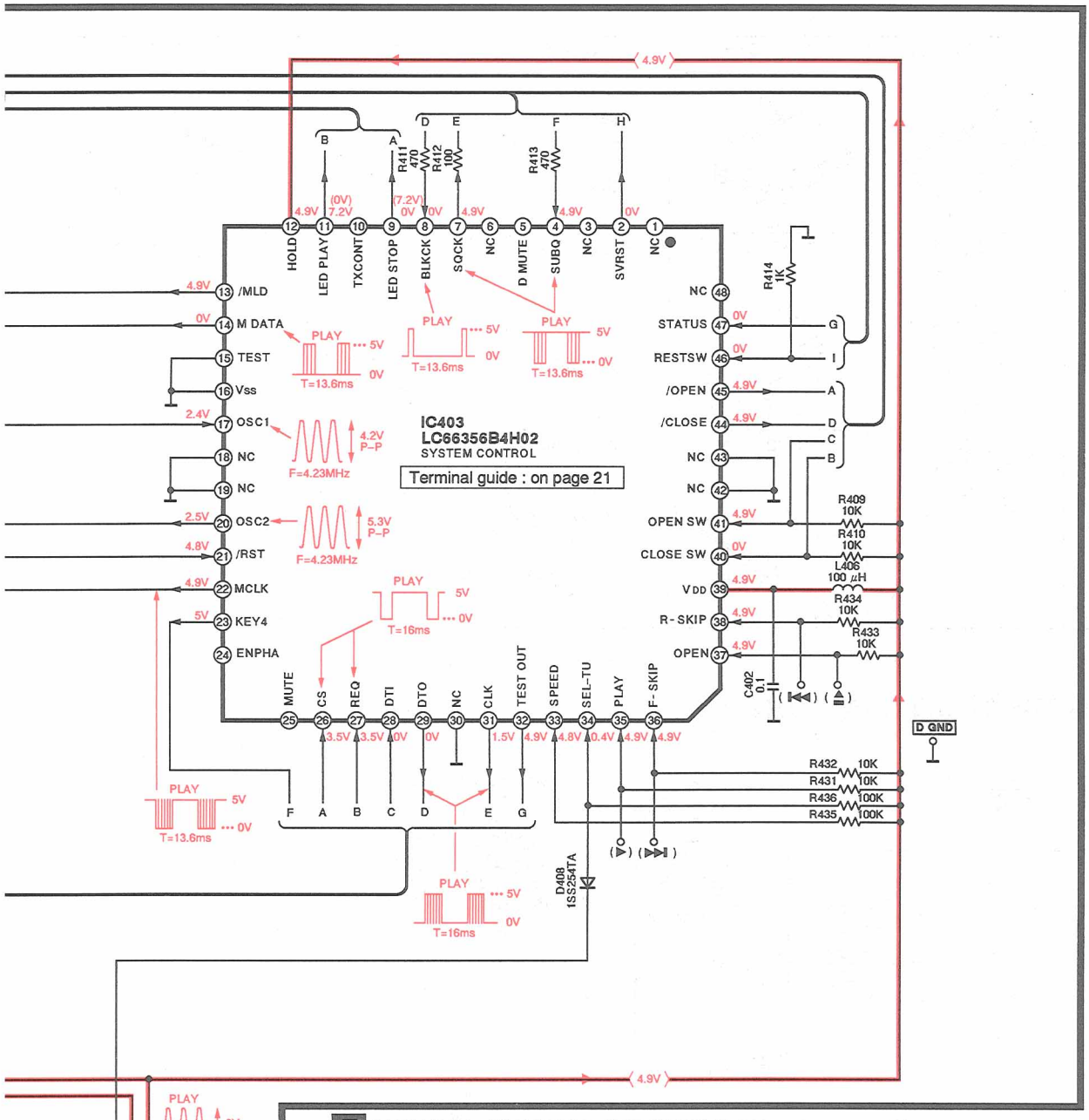
B LOADING MOTOR CIRCUIT
(P.C.Board:on page 20)

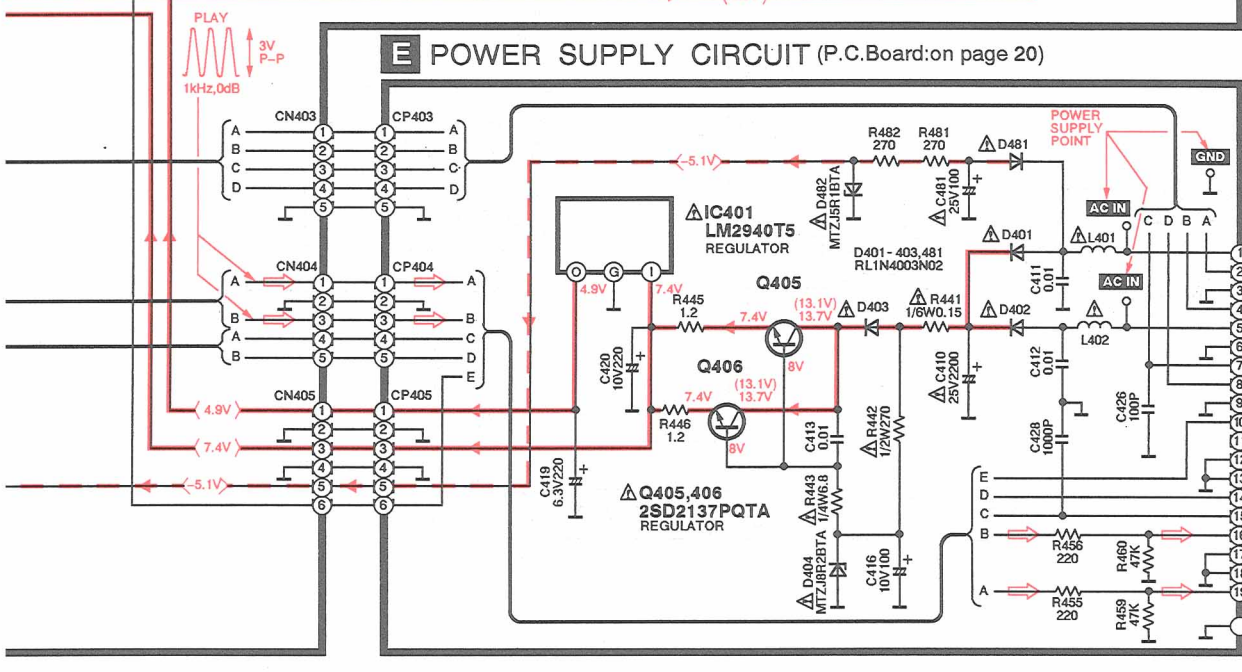
C MAIN CIRCUIT (P.C.Board:on page 20)

D OPERATION CIRCUIT
(P.C.Board:on page 20)



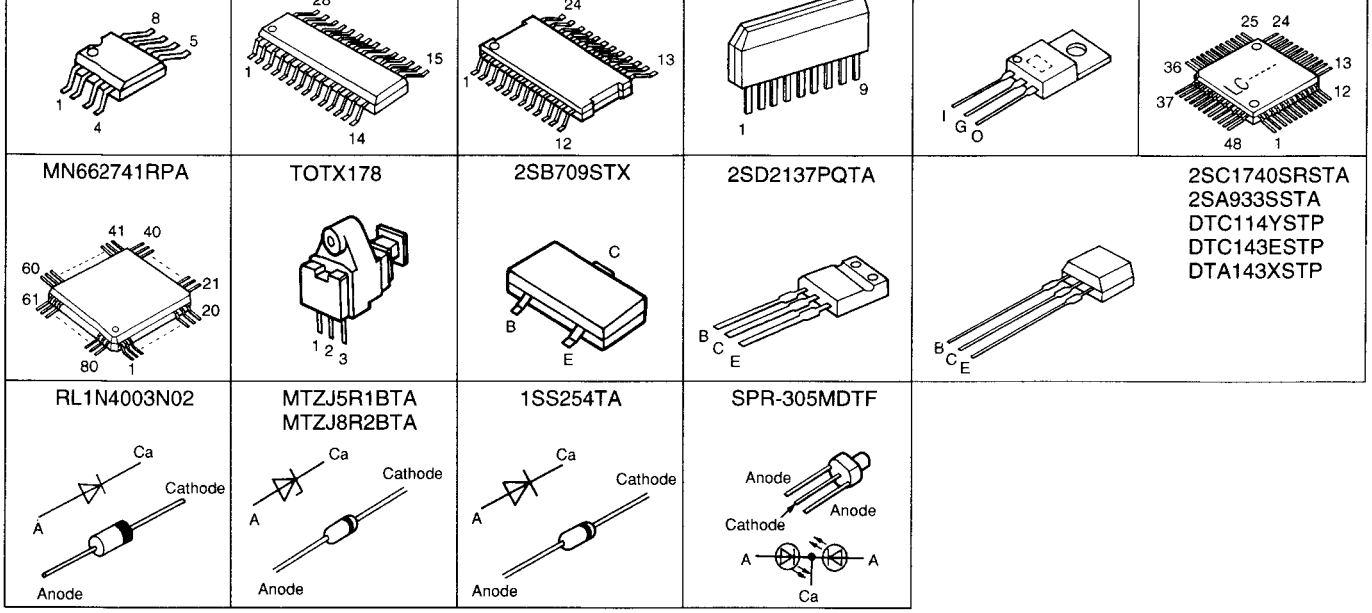
: Positive voltage line : Negative signal line : CD signal line



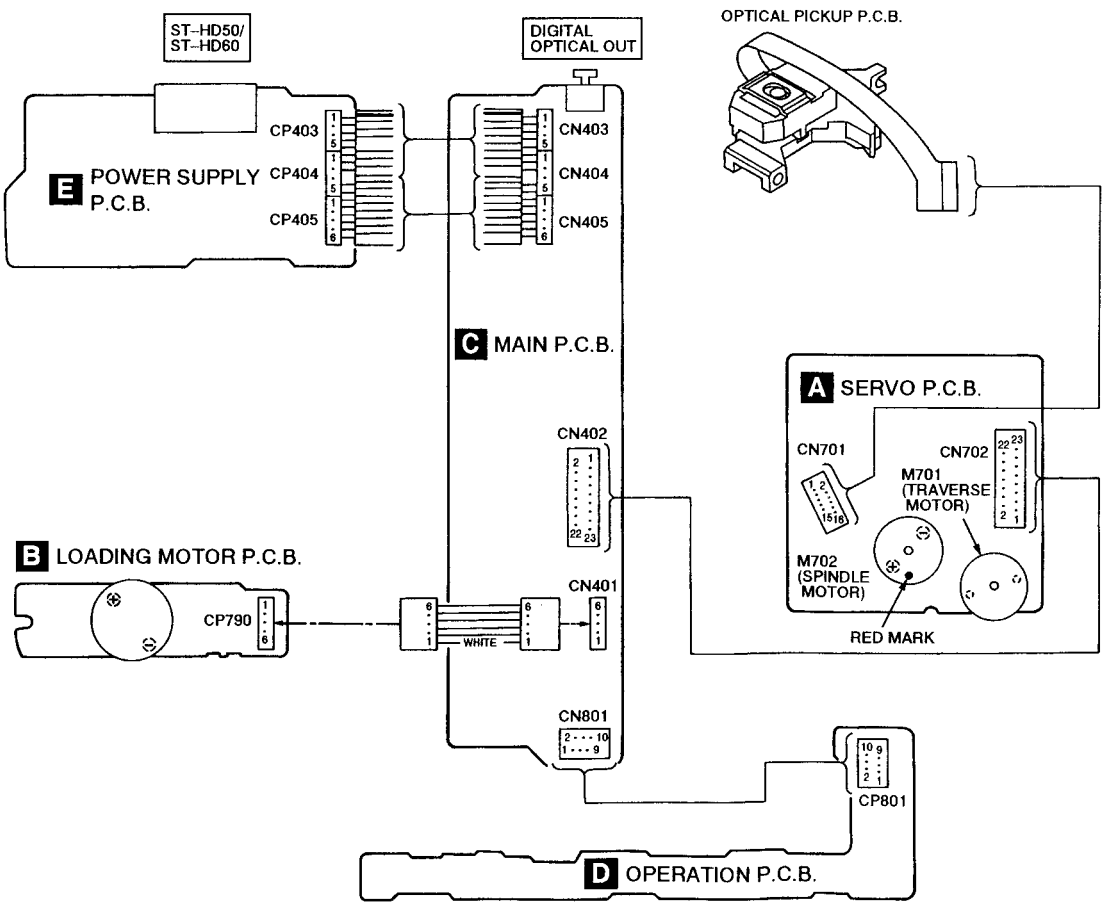


■ Type Illustration of ICs, Transistors and Diodes

BA4558FHTT1	AN8835SBE1	AN8389SE1	TA7291S	LM2940T5M	LC66356B4H02
MN662741RPA	TOTX178	2SB709STX	2SD2137PQTA		2SC1740SRSTA 2SA933SSTA DTC114YSTP DTC143ESTP DTA143XSTP
RL1N4003N02	MTZJ5R1BTA MTZJ8R2BTA	1SS254TA	SPR-305MDTF		



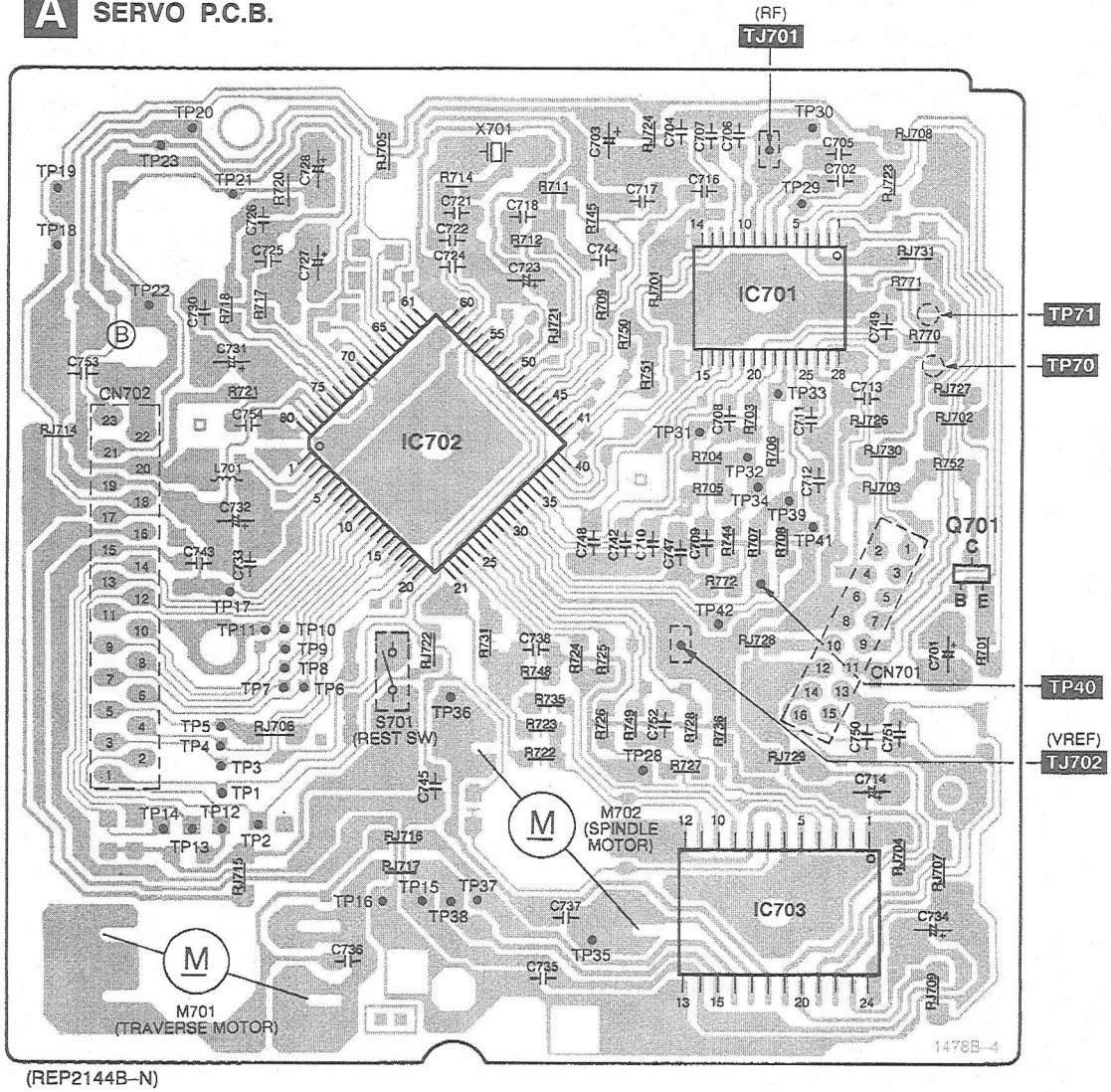
■ Wiring Connection Diagram



■ Printed Circuit Board Diagram

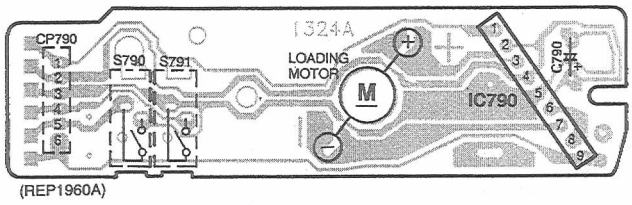
● This circuit board diagram may be modified at any time with the development of new technology.

A SERVO P.C.B.



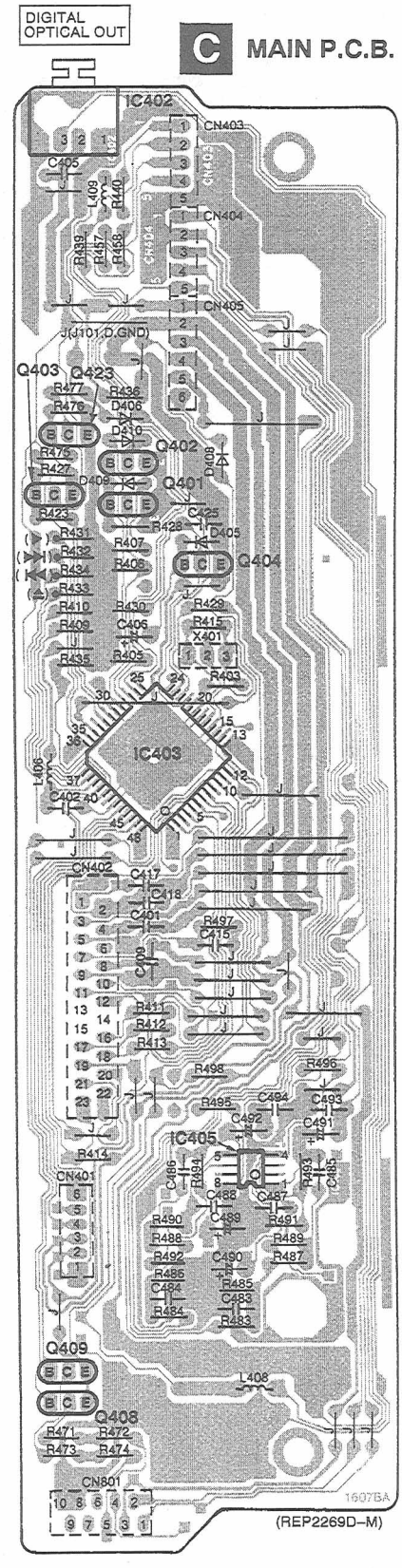
(REP2144B-N)

B LOADING MOTOR P.C.B.



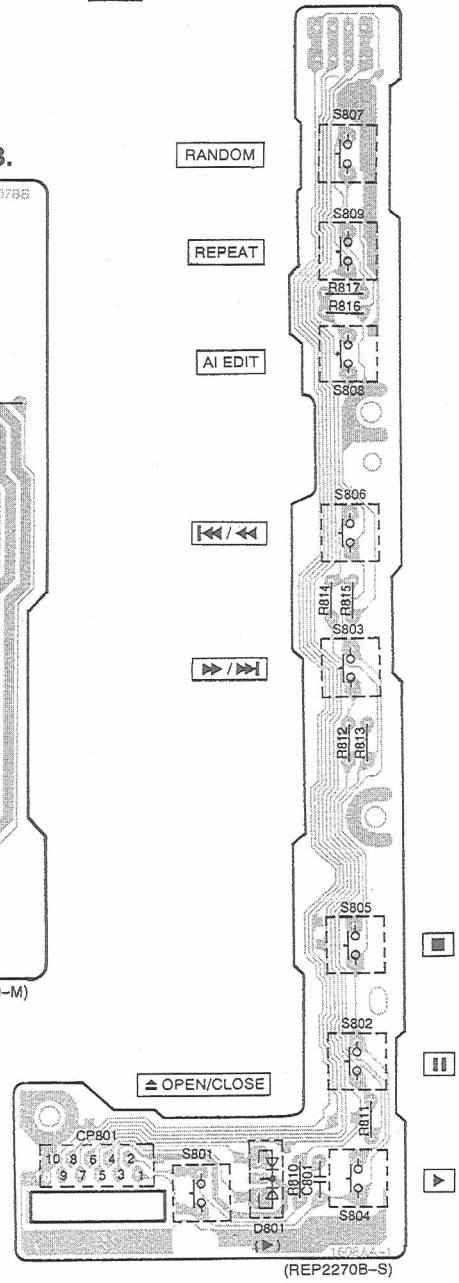
(REP1960A)

C MAIN P.C.B.



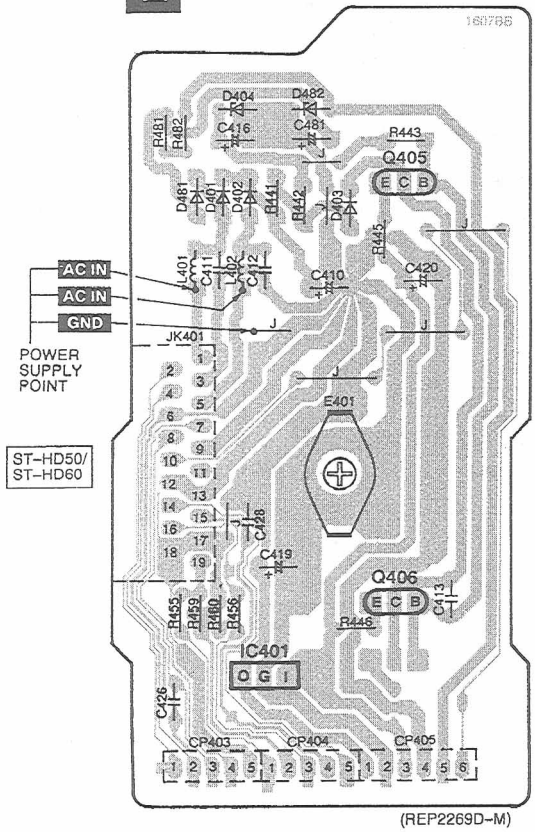
(REP2269D-M)

D OPERATION P.C.B.



(REP2270B-S)

E POWER SUPPLY P.C.B.



(REP2269D-M)

■ Terminal Function of IC's

● IC403 (LC66356B4H02): System Control

Pin No.	Terminal Name	I/O	Function
1	NC	—	Not used, open
2	SVRST	O	Reset signal output terminal
3	NC	—	Not used, open
4	SUBQ	I	Sub-code Q data input terminal
5	DMUTE	—	Not used, open
6	NC	—	Not used, open
7	SQCK	O	Sub-code Q resistor clock output terminal
8	BLKCK	I	Sub-code block clock input terminal (f = 75 Hz)
9	LED STOP	O	LED drive signal output terminal
10	TX CONT	—	Not used, open
11	LED PLAY	O	LED drive signal output terminal
12	HOLD	I	Not used, connected power supply
13	/MLD	O	Command load signal output terminal
14	MDATA	O	Command data signal output terminal
15	TEST	—	Test terminal
16	VSS	—	GND terminal
17	OSC1	I	Crystal OSC terminal (f = 4.2336 MHz)
18,19	NC	—	Not used, connected to GND
20	OSC2	O	Crystal OSC terminal (f = 4.2336 MHz)
21	/RST	I	Reset signal input terminal
22	MCLK	O	Command clock signal output terminal
23	KEY4	O	Key switch det. terminal
24	EMPHA	—	Not used, open
25	MUTE	—	Not used, open
26	CS	I	Communication chip select signal input terminal
27	REQ	I	Communication request signal input terminal
28	DTI	I	Communication data signal input/output terminal
29	DTO	O	
30	NC	—	Not used, open
31	CLK	O	Communication clock signal output terminal
32	TEST OUT	O	Not used, connected to power supply
33	SPEED	I	Not used, connected to resistor
34	SEL-TU	I	Communication data signal input terminal
35	PLAY	I	Not used, connected to resistor
36	F-SKIP	I	Not used, connected to resistor
37	OPEN	I	Not used, connected to resistor
38	R-SKIP	I	Not used, connected to resistor
39	VDD	I	Power supply input terminal
40	CLOSE SW	I	Disc tray "CLOSE" det. input terminal
41	OPEN SW	I	Disc tray "OPEN" det. input terminal
42,43	NC	—	Not used, connected to GND
44	/CLOSE	O	Loading motor "CLOSE" signal output terminal
45	/OPEN	O	Loading motor "OPEN" signal output terminal
46	RESTSW	I	Rest position det. input terminal
47	STATUS	I	Status signal input terminal
48	NC	—	Not used, open

● IC701 (AN8835SBE1): Servo Amp.

Pin No.	Terminal Name	I/O	Function
1	PDA	I	Focus (A-ch) signal input terminal
2	PDB	I	Focus (B-ch) signal input terminal
3	VCC	I	Power supply terminal
4	LPD	I	Laser PD signal input
5	LD	O	Laser power auto control signal output
6	RF	O	RF amp. terminal
7	RF IN	I	AGC input terminal
8	CAGC	I	AGC detection capacitor input
9	ARF	O	RF signal output
10	CSBRT	I	OFTR capacitor connection terminal
11	CEA	I	HPF-AMP capacitor connection terminal
12	BDO	O	Dropout detection control signal output
13	LDON	I	LD APC ON/OFF ("H": ON, "L": OFF)
14	GND	—	GND terminal
15	/RFDET	O	RF detection signal output ("L": det.)
16	CROSS	O	Tracking error zero cross output
17	OFTR	O	Off track detection signal output ("H": det.)
18	VDET	O	Vibration detection signal output ("H": det.)
19	ENV	O	Envelope output terminal
20	TEBPF	I	Vibration detection signal input ("H": det.)
21	CCRS	I	CROSS capacitor connection terminal
22	TE	O	Tracking error signal output
23	FE	O	Focus error signal output
24	TBAL	I	Tracking balance adjustment signal input
25	FBAL	I	Focus balance adjustment signal input
26	VREF	O	Reference voltage output
27	PDE	I	Tracking signal (E-ch) input terminal
28	PDF	I	Tracking signal (F-ch) input terminal

● **IC702 (MN662741RPA): Servo Processor, Digital Signal Processor, Digital Filter, D/A Converter**

Pin No.	Terminal Name	I/O	Function
1	BCLK	O	Bit clock output for serial data
2	LRCK	O	L/R clock signal output
3	SRDATA	O	Serial data output
4	$DV_{DD}1$	—	Power supply input (for digital circuit)
5	DVss1	—	GND (for digital circuit)
6	TX	O	Digital audio interface signal output
7	MCLK	I	Microprocessor command clock signal input (Latches data at first transition)
8	MDATA	I	Microprocessor command data signal input
9	MLD	I	Microprocessor command load signal input
10	SENSE	O	Sense signal output (OFT, FESL, MAGEND, NAJEND, POSAD, SFG) (Not used, open)
11	/FLOCK	O	Focus servo feeding signal output ("L": Feed)
12	/TLOCK	O	Tracking servo feeding signal output ("L": Feed) (Not used, open)
13	BLKCK	O	Sub-code block clock signal output (fBLKCK = 75 Hz during normal playback)
14	SQCK	I	External clock signal input for sub-code Q resister
15	SUBQ	O	Sub-code Q code output
16	DMUTE	I	Muting input ("H": Mute)
17	STAT	O	Status signal output (CRC, CUE, CLVS, TTSTVP, FCLV, SQCK)
18	/RST	I	Reset signal input
19	SMCK	—	1/2-divided clock signal of crystal oscillating at MSEL = "H" (fSMCK = 8.4672 MHz) 1/4-divided clock signal of crystal oscillating at MSEL = "L" (fSMCK = 4.2336 MHz) (Not used, open)
20	PMCK	—	1/192-divided clock signal of crystal oscillating (fPMCK = 88.2 kHz) (Not used, open)
21	TRV	O	Traverse forced feed output
22	TVD	O	Traverse drive output
23	PC	O	Spindle motor ON signal output ("L": ON)
24	ECM	O	Spindle motor drive signal output (forced mode output)
25	ECS	O	Spindle motor drive signal output (servo error signal output)
26	KICK	O	Kick pulse output
27	TRD	O	Tracking drive output
28	FOD	O	Focus drive output
29	VREF	I	D/A (drive) output (TVD, ECS, TRD, FOD, FBAL, TBAL) reference voltage input
30	FBAL	O	Focus balance adjustment output
31	TBAL	O	Tracking balance adjustment output
32	FE	I	Focus error signal input (analog input)
33	TE	I	Tracking error signal input (analog input)
34	RFENV	I	RF envelope signal input
35	VDET	I	Vibration detection signal input ("H": detection)
36	OFT	I	Off-track signal input ("H": off track)
37	TRCRS	I	Track cross signal input
38	/RFDET	I	RF detection signal input ("L": detection)
39	BDO	I	Dropout signal input ("H": Dropout)
40	LDON	O	Laser on signal output ("H": ON)
41	TES	O	Tracking error shunt signal output ("H": shunt)
42	PLAY	O	Play signal out ("H": PLAY) (Not used, open)
43	WVEL	O	Double speed status signal output ("H": Double speed) (Not used, open)
44	ARF	I	RF signal input
45	IREF	I	Reference current input
46	DRF	—	DSL bias (Not used, open)
47	DSLF	I/O	DSL loop filter
48	PLLF	I/O	PLL loop filter
49	VCOF	I/O	VCO loop filter
50	$AV_{DD}2$	—	Power supply input (for analog circuit)
51	AVss2	—	GND (for analog circuit)
52	EFM	—	EFM signal output (Not used, open)
53	PCK	—	PLL extraction clock output (fPCK= 4.321 MHz during normal playback) (Not used, open)
54	PDO	—	Phase comparison signal of EFM and PCK signals (Not used, open)
55	SUBC	O	Sub-code serial data output
56	SBCK	I	Clock input for sub-code serial data
57	Vss	—	GND
58	X1	I	Crystal oscillating circuit input (f = 16.9344 MHz)
59	X2	O	Crystal oscillating circuit output (f = 16.9344 MHz)
60	V_{DD}	—	Power supply input (for oscillating circuit)
61	BYTCK	—	Byte clock output (Not used, open)
62	/CLDCK	O	Sub-code frame clock signal output (fCLDCK = 7.35 kHz during normal playback)
63	FCLK	—	Crystal frame clock signal output (fFCLK = 7.35 kHz, double = 14.7 kHz) (Not used, open)
64	IPFLAG	O	Interpolation flag output ("H": Interpolation)
65	FLAG	O	Flag output (Not used, open)
66	CLVS	O	Spindle servo phase synchronizing signal output ("H": CLV, "L": rough servo) (Not used, open)
67	CRC	O	Sub-code CRC checked output ("H": OK, "L": NG) (Not used, open)
68	DEMPH	O	De-emphasis ON signal output ("H": ON) (Not used, open)
69	RESY	—	Frame re-synchronizing signal output (Not used, open)
70	/RST2	I	Reset input through MASH circuit ("L": Reset)
71	/TEST	I	Test input

● **IC702 continued**

Pin No.	Terminal Name	I/O	Function
72	AVDD1	—	Power supply input (for analog circuit)
73	OUTL	O	Left channel audio signal output
74	AVss1	—	GND
75	OUTR	O	Right channel audio signal output
76	RSEL	I	RF signal polarity assignment input (at "H" level: RSEL = "H") (at "L" level: RSEL = "L")
77	CSEL	I	Crystal oscillating frequency designation input ("L": 16.9344 MHz, "H": 33.8688 MHz)
78	PSEL	I	Test terminal (Normal: "L") (Not used, connected to GND)
79	MSEL	I	"SCMK" terminal frequency select ("L": SCMK = 4.2336MHz) (Not used, connected to GND)
80	SSEL	I	"SCMK" terminal mode select ("H": Q code buffer) (Not used, connected to power supply)

● **IC703 (AN8389SE1): Focus/Tracking Coil Drive Traverse/Spindle Motor Drive**

Pin No.	Terminal Name	I/O	Function
1	Vcc	—	Power supply
2	VREF	I	VREF input
3	IN4	I	Focus driver (4) input
4	IN3	I	Tracking driver (3) input
5	GND	—	Ground connection
6	NC	—	Ground connection
7	NRESET	—	Reset input (Not used, open)
8	GND	—	Ground connection
9	IN2	I	Spindle motor driver (2) input
10	PC2	I	PC2 (power cut) input
11	IN1	I	Traverse motor driver (1) input
12	PC1	I	PC1 (power cut) input
13	PVcc1	—	Power supply (1) for driver
14	PGND1	—	Ground connection (1) for driver
15	D1-	O	Traverse motor driver (1) reverse-action output
16	D1+	O	Traverse motor driver (1) forward-action output
17	D2-	O	Spindle motor driver (2) reverse-action output
18	D2+	O	Spindle motor driver (2) forward-action output
19	D3-	O	Tracking actuator (3) reverse-action output
20	D3+	O	Tracking actuator (3) forward-action output
21	D4-	O	Focus actuator (4) reverse-action output
22	D4+	O	Focus actuator (4) forward-action output
23	PGND2	—	Ground connection (2) for driver
24	PVcc2	—	Power supply (2) for driver

■ Error Code Display and Servo Adjustment Function

This unit has an error code display function, so that if the unit operates incorrectly, the fault is displayed using an error code on the FL display of the tuner (ST-HD50 or ST-HD60). It also has a servo adjustment function for displaying the status of servo system functions (Focus, Tracking, CLV Servo) on the tuner's FL display.
The system control IC and FL display are part of the tuner so make sure the system has been connected properly before using three functions. (This unit can be operated independently, although the error code display and servo adjustment functions cannot be used.)
Use these two functions for guidance during fault diagnosis and repair.

Note:
Check beforehand for scratching or soiling of the test disc (SZZP1054C), and soiling or other problems with the pickup lens.

● Error code display procedure

Automatic adjustment results

Turn the power ON and select the CD mode by press the select switch of the tuner

↓

Load the test disc (SZZP1054C).

↓

Hold down the STOP button for at least 2 seconds, and then press the ►►/►►I (F.SKIP/SEARCH) button for at least 2 seconds while continuing to hold down the STOP button.

↓

A servo section error code is displayed. (See **Table 2**.)
Use this error code display as a guideline for finding the malfunction point in the servo circuitry. If the error code **"E-00"** is displayed, the unit is "OK (No problem)."

Checking the mechanism switches

If there are mechanism errors, mechanism OK/NG error code is displayed. (See **Table 1**.)
This error code can be used diagnose whether or not the mechanism is OK. If there are multiple errors, these can be displayed successively by pressing the F. SKIP button.

↓

Remove the disc and turn the power OFF. (The error code display mode is canceled.)

● Servo adjustment procedure

Turn the power ON and select the CD mode by press the select switch of the tuner

↓

Load the test disc (SZZP1054C).

↓

Hold down the STOP button for at least 2 seconds, and then press the ►►/►►I (F.SKIP/SEARCH) button for at least 2 seconds while continuing to hold down the STOP button.

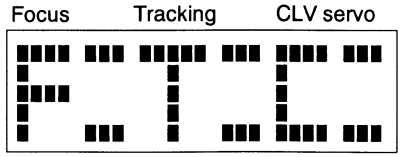
↓

Press the ► (PLAY) button, and play for 10 seconds.

↓

Servo adjustment results are displayed.

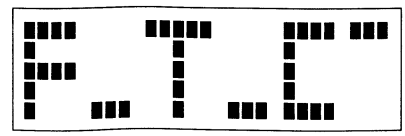
Focus Tracking CLV servo



↓

Remove the disc and turn the power OFF.

(Example)



⇒ Normal

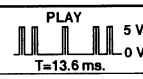
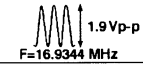
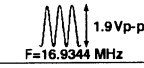
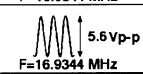
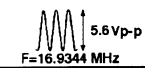
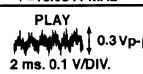
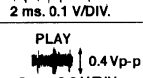
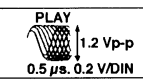
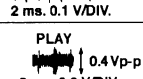
	"L" level	"H" level
Focus system	normal	defective
Tracking system	normal	defective
CLV servo system	defective	normal

● Table 1

FL display	Symptom	Cause
H-15	When CD tray opens, it closes by itself.	Disc tray "Open" detection switch (S4) fault.
H-16	When CD tray close, it opens by itself.	
F-15	Does not play, even when CD play button is pressed.	Pickup rest position detection switch (S701) fault.
F-16	Traverse pushes up disc tray.	Up position detection switch (S3) fault.
F-26	Does not move even when "▶" (PLAY) button is pressed.	System control or servo processor IC (IC403, IC702) fault.

● Table 2

※ The unit is satisfactory if the error code is **"E-00"** or **"E02"**.
※ Before testing, check that the test disc is free of scratches and optical pickup is clean.

FL error code display	Symptom	Probable cause	Signal to check		Normal voltage and waveform values	
			Location	Signal name	PLAY	STOP
E-01	Focus and tracking offset adjustments not completed in specified time period.	①Clocks X1 and X2, power supply VDD, and reset (/RST), all on IC702. ②MDATA, MCLK, MLD, and SENSE signals to/from mechanism controller.	IC702-8 pin	MDATA		0 V
			IC702-7 pin	MCLK		4.8 V
			IC702-9 pin	MLD		4.9 V
			IC702-10 pin	SENSE	0 V	0 V
			IC702-18 pin	/RST	4.9 V	4.9 V
			IC702-58 pin	X1		
			IC702-59 pin	X2		
E-02 E-03 E-05 E-06 E-07 E-09 E-0A E-0B E-0D E-0E E-0F	Disc play unstable	①Scratches or contaminants on disc surface ②Focus and Tracking servo circuits (check waveforms, voltages, and part values.) ③Spindle driver circuit ④Optical pickup	IC702-32 pin	F E		2.5 V
			IC702-33 pin	T E		2.5 V
			IC702-28 pin	FOD	2.5 V	2.5 V
			IC702-27 pin	TRD	2.5 V	2.5 V
			IC702-26 pin	KICK	2.5 V	2.5 V
			IC702-11 pin	/FLOCK	0 V	4.9 V
			IC702-38 pin	/RF DET	0 V	4.9 V
			TJ701	R F		3.9 V
			IC702-17 pin	STAT	4.9 V	0 V
E-04 E-08 E-0C	Focus or Tracking gain adjustment not completed in the specified time period.	①Scratches or contaminants on disc surface ②Focus and tracking servo circuit (check waveforms, voltages, and part values.) ③Optical pickup	IC702-32 pin	F E		2.5 V
			IC702-33 pin	T E		2.5 V
			IC702-36 pin	O F T	0 V	0 V
			IC702-12 pin	/TLOCK	0 V	0 V

■ To Supply Power Source

Cautions:
- It is very dangerous to look at or touch the laser beam. (Laser radiation is invisible.)
  With the unit turned "on", laser radiation is emitted from the pickup lens.
- Avoid exposure to the laser beam, especially when performing adjustments.

This unit SL-HD60 is designed to operate on power supplied from the Amplifier SE-HD50 or SE-HD60 through the Tuner ST-HD50 or ST-HD60. When connecting the unit to other system components, do not connect to the Amplifier SE-HD50 or SE-HD60 directly. Be sure to connect this unit through the Tuner ST-HD50 or ST-HD60.
When operating the unit SL-HD60 alone for testing and servicing, without having power supplied from the Amplifier SE-HD50 or SE-HD60 and the Tuner ST-HD50 or ST-HD60, use the following method.

Power Supply to This Unit Alone

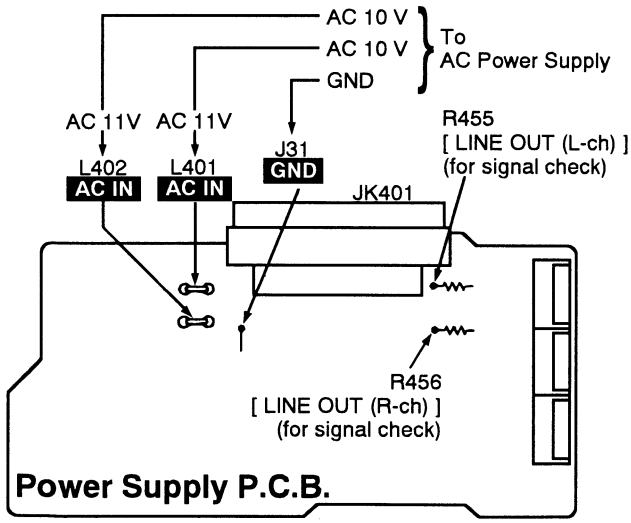
1. Short-circuit the section **AC IN (L401)**, **GND (J31)** and **AC IN (L402)**.
2. AC 11V supply to the short point just now.

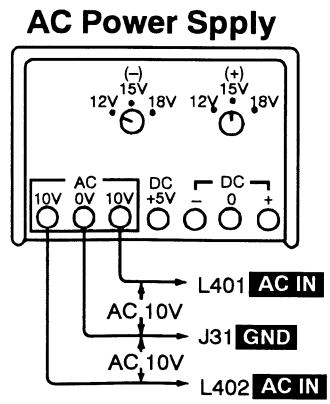
Operate to This Unit Alone

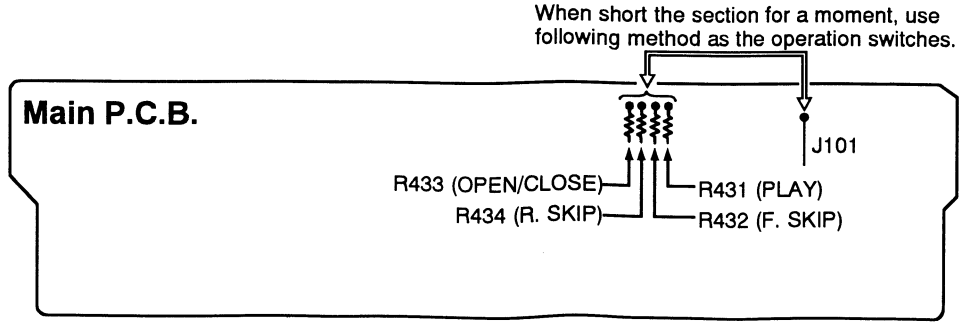
- If this unit SL-HD60 operates by alone, become to not operate the operation switches of the front panel. Therefore use following method as the operation switches.
  When short the section following points for a moment, be able to operate as follows.
  short the section between **R431** and **J101** ..... **PLAY**
  short the section between **R432** and **J101** ..... **F. SKIP**
  short the section between **R433** and **J101** ..... **OPEN/CLOSE of the Disc Tray**
  short the section between **R434** and **J101** ..... **R. SKIP**

To Check Signals

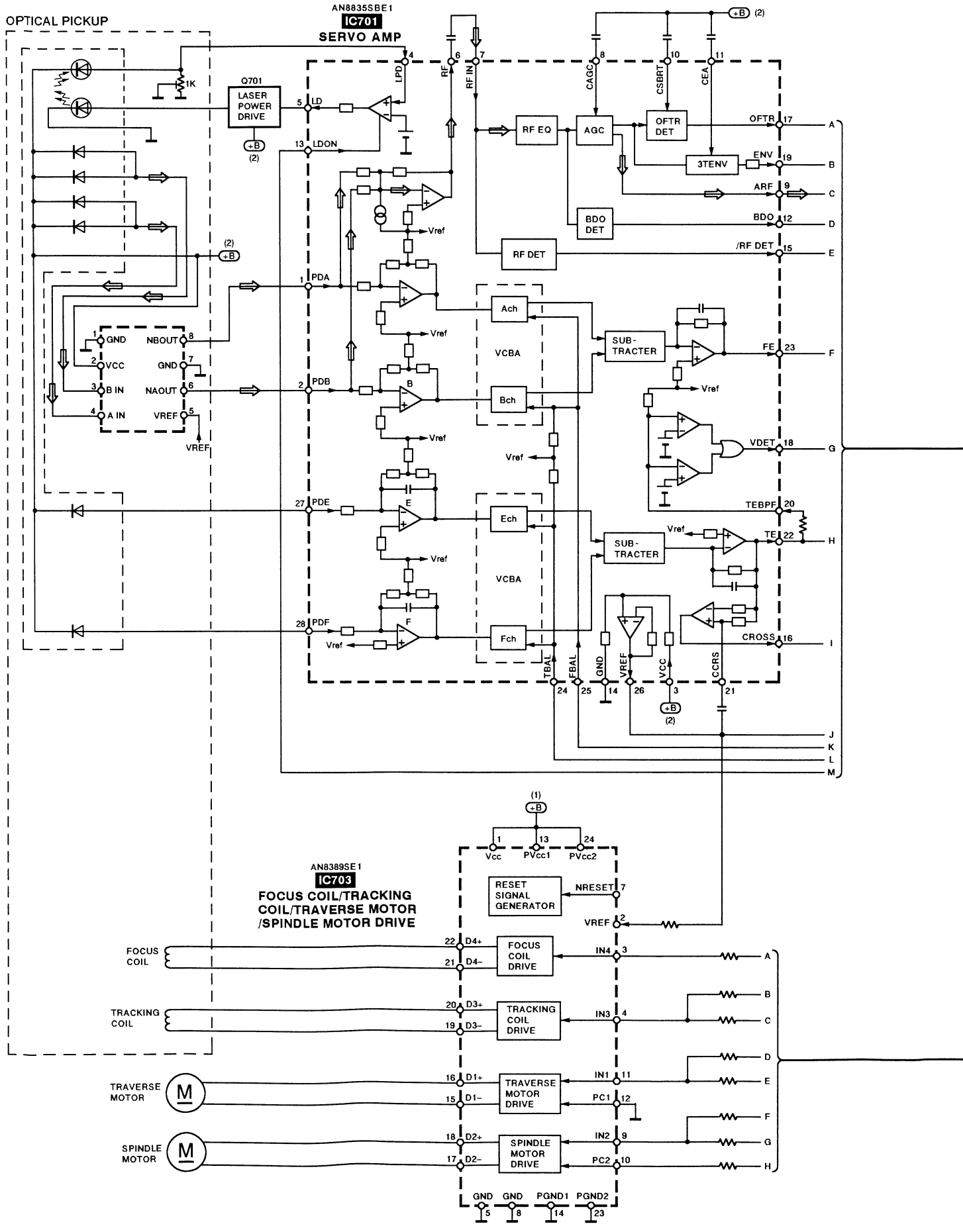
Connect the oscilloscope or the speaker with built-in amplifier to the section between **R455 [LINE OUT (L-ch)]** and the **J31** (**GND**), as well as the section between **R456 [LINE OUT (R-ch)]** and the **J31** (**GND**), and check if the signals are outputting from this unit as follow.

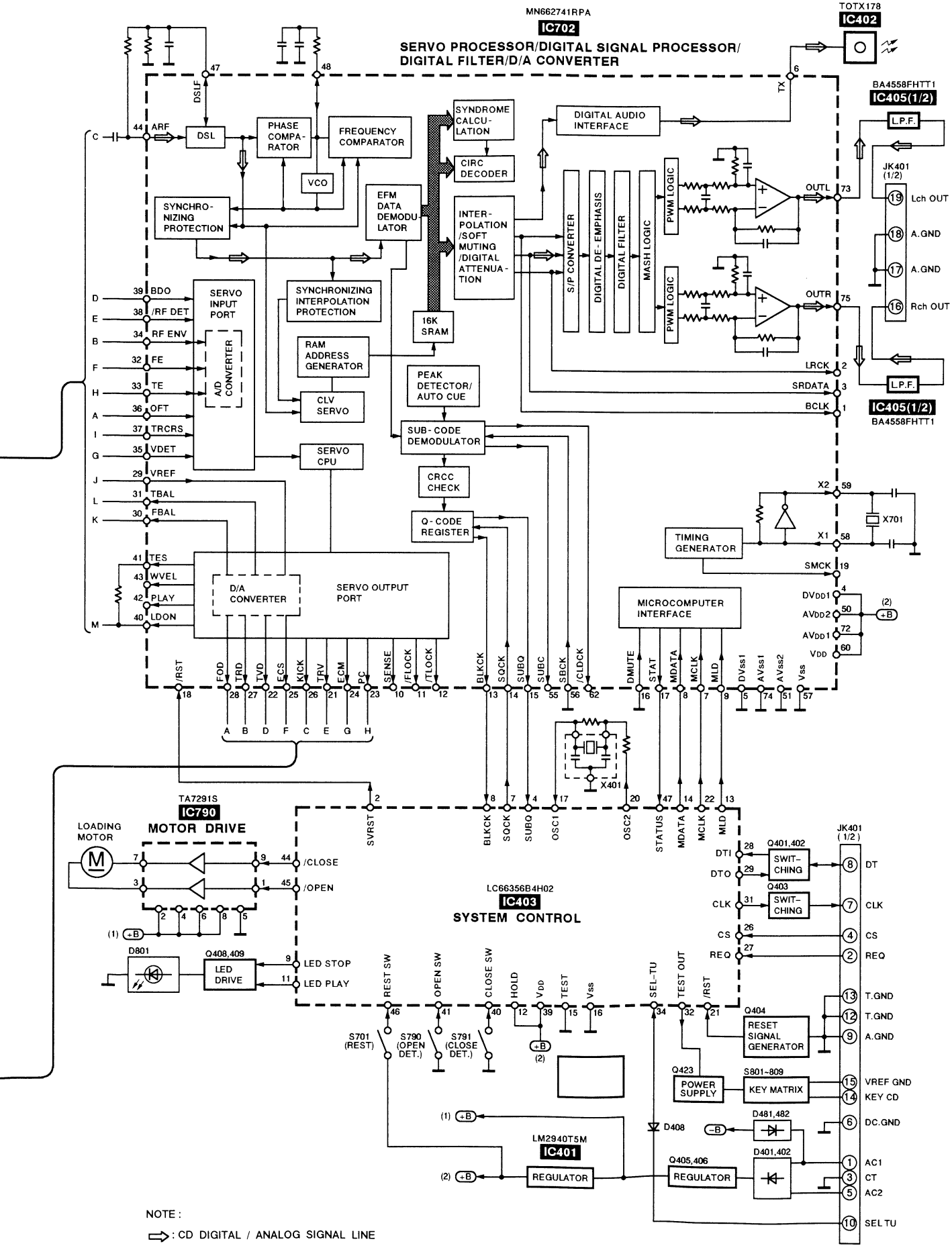






■ Block Diagram

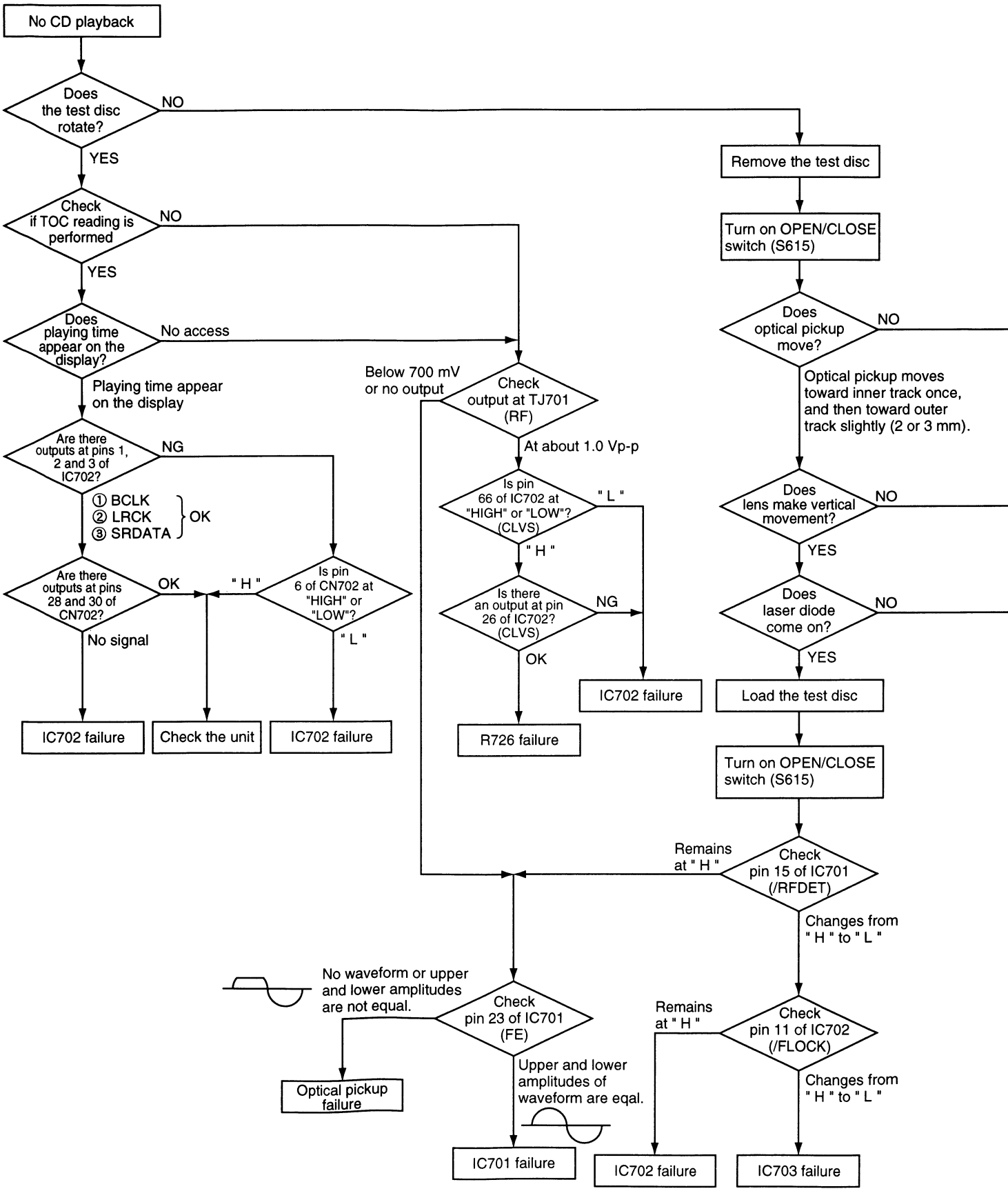


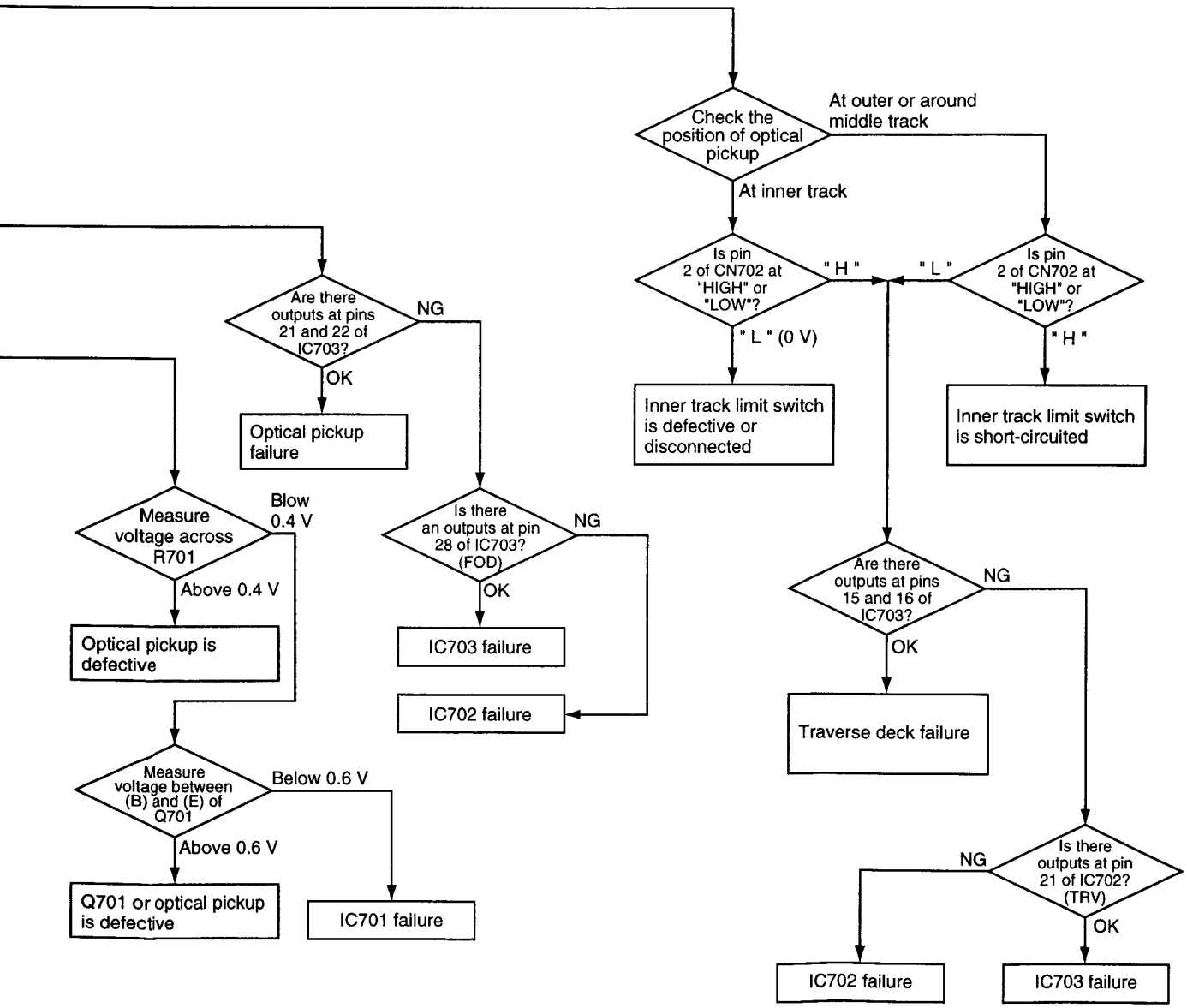


NOTE :

⇨ : CD DIGITAL / ANALOG SIGNAL LINE

■Troubleshooting Guide


No CD playback
Does the test disc rotate?
NO
YES
Remove the test disc
Turn on OPEN/CLOSE switch (S615)
Check if TOC reading is performed
NO
YES
Does playing time appear on the display?
No access
Playing time appear on the display
Does optical pickup move?
NO
Optical pickup moves toward inner track once, and then toward outer track slightly (2 or 3 mm).
Below 700 mV or no output
Check output at TJ701 (RF)
At about 1.0 Vp-p
Are there outputs at pins 1, 2 and 3 of IC702?
NG
① BCLK
② LRCK
③ SRDATA
OK
Is pin 66 of IC702 at "HIGH" or "LOW"? (CLVS)
" L "
" H "
Does lens make vertical movement?
NO
YES
Are there outputs at pins 28 and 30 of CN702?
OK
" H "
Is pin 6 of CN702 at "HIGH" or "LOW"?
No signal
" L "
Is there an output at pin 26 of IC702? (CLVS)
NG
OK
Does laser diode come on?
NO
YES
IC702 failure
Load the test disc
IC702 failure
Check the unit
IC702 failure
R726 failure
Turn on OPEN/CLOSE switch (S615)
Remains at " H "
Check pin 15 of IC701 (/RFDET)
Changes from " H " to " L "
No waveform or upper and lower amplitudes are not equal.
Check pin 23 of IC701 (FE)
Remains at " H "
Check pin 11 of IC702 (/FLOCK)
Optical pickup failure
Upper and lower amplitudes of waveform are eqal.
Changes from " H " to " L "
IC701 failure
IC702 failure
IC703 failure


Check the position of optical pickup
At outer or around middle track
At inner track
Is pin 2 of CN702 at "HIGH" or "LOW"?
" H "
" L "
" L " (0 V)
Inner track limit switch is defective or disconnected
Is pin 2 of CN702 at "HIGH" or "LOW"?
" H "
Inner track limit switch is short-circuited
Are there outputs at pins 21 and 22 of IC703?
NG
OK
Optical pickup failure
Measure voltage across R701
Blow 0.4 V
Above 0.4 V
Optical pickup is defective
Is there an outputs at pin 28 of IC703? (FOD)
NG
OK
IC703 failure
IC702 failure
Measure voltage between (B) and (E) of Q701
Below 0.6 V
Above 0.6 V
Q701 or optical pickup is defective
IC701 failure
Are there outputs at pins 15 and 16 of IC703?
NG
OK
Traverse deck failure
Is there outputs at pin 21 of IC702? (TRV)
NG
OK
IC702 failure
IC703 failure

■ Replacement Parts List (Electrical)

Notes: *Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety.
Furthermore, special parts which have purposes of fire-retardant (resistors), high-quality sound (capacitors), low-noise (resistors), etc. are used.
When replacing any of components, be sure to use only manufacture's specified parts shown in the parts list.
*The parenthesized indications in the Remarks columns specify the areas. (Refer to the cover page for area.)
Parts without these indications can be used for all areas.
*[M] Indicates in Remarks columns parts that are supplied by MESA.

Ref. No.	Part No.	Part Name & Description	Remarks
		INTEGRATED CIRCUIT(S)	
IC401⚠	LM2940T5	IC	[M]
IC402	T0TX178	IC	[M]
IC403	LC66356B4H02	IC	[M]
IC405	BA4558FHT1	IC	[M]
IC790	TA7291S	IC	[M]
		TRANSISTOR(S)	
Q401	2SC1740SRSTA	TRANSISTOR	[M]
Q402	DTC143ESTP	TRANSISTOR	[M]
Q403	2SC1740SRSTA	TRANSISTOR	[M]
Q404	DTC114YSTP	TRANSISTOR	[M]
Q405, 406⚠	2SD2137PQTA	TRANSISTOR	[M]
Q408, 409	DTA143XSTP	TRANSISTOR	[M]
Q423	2SA933SSTA	TRANSISTOR	[M]
		DIODE(S)	
D401-403⚠	RL1N4003N02	DIODE	[M]
D404⚠	MTZJ8R2BTA	DIODE	[M]
D405, 406	1SS254TA	DIODE	[M]
D408-410	1SS254TA	DIODE	[M]
D481⚠	RL1N4003N02	DIODE	[M]
D482⚠	MTZJ5R1BTA	DIODE	[M]
D801	SPR-305MDTF	DIODE	[M]
		COIL(S)	
L401, 402⚠	BL02RN2R65T2	COIL	[M]
L406	ELEXT101KA9	COIL	[M]
L408	BL02RN2R62T4	COIL	[M]
L409	ELEXT1R0KA9	COIL	[M]
		OSCILLATOR(S)	
X401	EF0EC4234T3	OSCILLATOR	[M]
		SWITCH(ES)	
S790, 791	RSH1A005	SW	[M]
S801-809	EVQ21405R	SW	[M]
		CONNECTOR(S)/JACK(S)	

Ref. No.	Part No.	Part Name & Description	Remarks
CN401	RJP6G17ZA	CONNECTOR(6P)	[M]
CN402	RJS1A6223-1	CONNECTOR(23P)	[M]
CN403, 404	RJS1A6605	CONNECTOR(5P)	[M]
CN405	RJS1A6606	CONNECTOR(6P)	[M]
CN801	RJU099W10	CONNECTOR(10P)	[M]
CP790	RJP6G17ZA	CONNECTOR(6P)	[M]
CP801	RJT099W10-1	CONNECTOR(10P)	[M]
JK401	RJT065K19	CONNECTOR(19P)	[M]
		GND PLATE	
E401	SNE1004-2	GND PLATE	[M]
		CD SERVO CIRCUIT	
		INTEGRATED CIRCUIT(S)	
IC701	AN8835SBE1	IC	[M]
IC702	MN662741RPA	IC	[M]
IC703	AN8389SE1	IC	[M]
		TRANSISTOR(S)	
Q701	2SB709S	TRANSISTOR	[M]
		COIL(S)	
L701	RLBN102V-Y	COIL	[M]
		OSCILLATOR(S)	
X701	RSXB16M9J02T	OSCILLATOR	[M]
		SWITCH(ES)	
S701	RSM0006-P	SW	[M]
		CONNECTOR(S)	
CN701	RJU035T016-1	CONNECTOR (16P)	[M]
CN702	RJS1A6723-1Q	CONNECTOR (23P)	[M]

■ Resistors and Capacitors

Notes: *Capacity values are in microfarads (μF) unless specified otherwise, P = Pico-farads (pF) F = Farads (F)
*Resistance values are in ohms, unless specified otherwise, 1K = 1,000 (OHM) 1M = 1,000k (OHM)
*[M] Indicates in Remarks columns parts that are supplied by MESA.

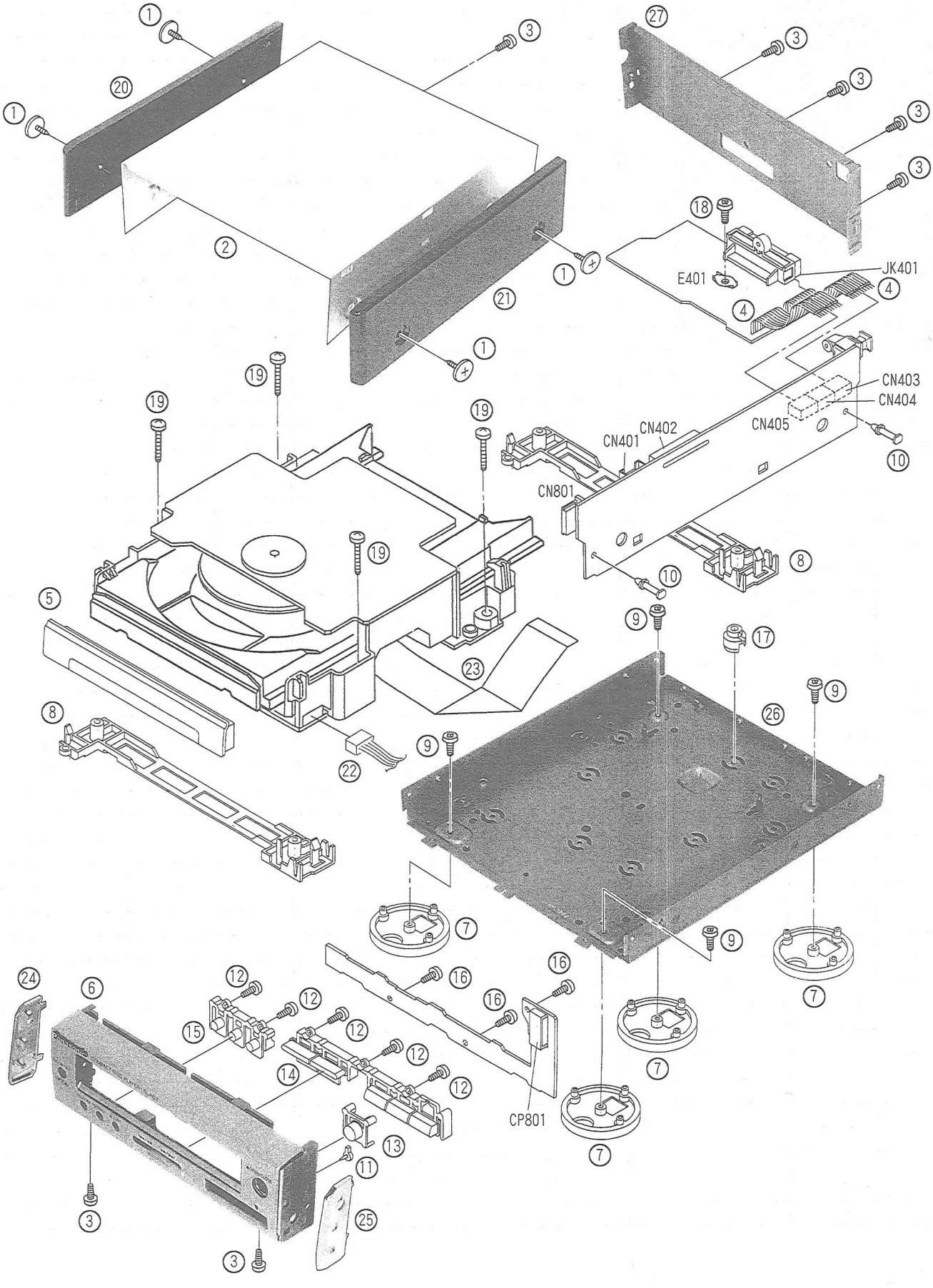
Ref. No.	Part No.	Values & Remarks
		RESISTORS
R403	ERDS2TJ102	1/4W 1K [M]
R405	ERDS2TJ103	1/4W 10K [M]
R406	ERDS2TJ473	1/4W 47K [M]
R407	ERDS2TJ223	1/4W 22K [M]
R409, 410	ERDS2TJ103	1/4W 10K [M]
R411	ERDS2TJ471	1/4W 470 [M]
R412	ERDS2TJ101	1/4W 100 [M]
R413	ERDS2TJ471	1/4W 470 [M]
R414	ERDS2TJ102	1/4W 1K [M]
R415	ERDS2TJ105T	1/4W 1M [M]
R423	ERDS2TJ472	1/4W 4.7K [M]
R427	ERDS2TJ472	1/4W 4.7K [M]
R428	ERDS2TJ103	1/4W 10K [M]
R429	ERDS2TJ471	1/4W 470 [M]
R430	ERDS2TJ104	1/4W 100K [M]
R431-434	ERDS2TJ103	1/4W 10K [M]
R435, 436	ERDS2TJ104	1/4W 100K [M]
R439	ERDS2TJ101	1/4W 100 [M]
R440	ERDS2TJ102	1/4W 1K [M]
R441⚠	ERQ16NKWR15E	1/6W 0.15 [M]
R442⚠	ERDS1FVJ271T	1/2W 270 [M]
R443⚠	ERD2FCJ6R8	1/4W 6.8 [M]
R445, 446	ERDS2TJ1R2	1/4W 1.2 [M]
R455, 456	ERDS2TJ221	1/4W 220 [M]
R457	ERDS2TJ1R2	1/4W 1.2 [M]
R458	ERDS2TJ102	1/4W 1K [M]
R459, 460	ERDS2TJ473	1/4W 47K [M]
R471-474	ERDS2TJ391	1/4W 390 [M]
R475-477	ERDS2TJ103	1/4W 10K [M]
R481, 482	ERDS2TJ271	1/4W 270 [M]
R483, 484	ERDS2TJ102	1/4W 1K [M]
R485, 486	ERDS2TJ104	1/4W 100K [M]
R487-490	ERDS2TJ223	1/4W 22K [M]
R491, 492	ERDS2TJ273	1/4W 27K [M]
R493, 494	ERDS2TJ332	1/4W 3.3K [M]
R495, 496	ERDS2TJ101	1/4W 100 [M]
R497	ERDS2TJ182	1/4W 1.8K [M]
R498	ERDS2TJ272T	1/4W 2.7K [M]
R810	ERDS2TJ821	1/4W 820 [M]
R811	ERDS2TJ102	1/4W 1K [M]
R812	ERDS2TJ122	1/4W 1.2K [M]
R813	ERDS2TJ152	1/4W 1.5K [M]
R814	ERDS2TJ182	1/4W 1.8K [M]
R815	ERDS2TJ222	1/4W 2.2K [M]
R816	ERDS2TJ332	1/4W 3.3K [M]
R817	ERDS2TJ472	1/4W 4.7K [M]

Ref. No.	Part No.	Values & Remarks
		CAPACITORS
C401	ECBT1H102KB5	50V 1000P [M]
C402	ECBT1H104ZF5	50V 0.1U [M]
C405	ECBT1H104ZF5	50V 0.1U [M]
C406	RCE1HKS3R3BV	50V 3.3U [M]
C409	ECBT1E103ZF	25V 0.01U [M]
C410⚠	ECA1EM222B	25V 2200U [M]
C411-413	ECBT1E103ZF	25V 0.01U [M]
C415	ECBT1H330J5	50V 33P [M]
C416	RCE1AKA101BG	10V 100U [M]
C417, 418	ECBT1H102KB5	50V 1000P [M]
C419	ECEA0JKA221B	6.3V 220U [M]
C420	ECEA1AKA221B	10V 220U [M]
C425	ECBT1E103ZF	25V 0.01U [M]
C426	ECBT1H101KB5	50V 100P [M]
C428	ECBT1H102KB5	50V 1000P [M]
C481⚠	ECA1EM101B	25V 100U [M]
C483, 484	ECBT1H102KB5	50V 1000P [M]
C485, 486	ECBT1H331KB5	50V 330P [M]
C487, 488	ECBT1H121KB5	50V 120P [M]
C489, 490	ECEA0JKS220B	6.3V 22U [M]
C491, 492	ECEA1AKA220B	10V 22U [M]
C493, 494	ECBT1H101KB5	50V 100P [M]
C790	ECA1AKF820E	10V 82U [M]
C801	ECBT1H102KB5	50V 1000P [M]
		CD SERVO CIRCUIT
		RESISTORS
R701	ERJ6GEYJ4R7V	1/10W 4.7 [M]
R703	ERJ6GEYJ823	1/10W 82K [M]
R704	ERJ6GEYJ102A	1/10W 1K [M]
R705	ERJ6GEYJ103V	1/10W 10K [M]
R706	ERJ6GEYJ102A	1/10W 1K [M]
R707	ERJ6GEYJ474V	1/10W 470K [M]
R708	ERJ6GEYJ154V	1/10W 150K [M]
R709	ERJ6GEYJ683V	1/10W 68K [M]
R711	ERJ6GEYJ154V	1/10W 150K [M]
R712	ERJ6GEYJ221V	1/10W 220 [M]
R714	ERJ6GEYJ121V	1/10W 120 [M]
R717, 718	ERJ6GEYJ102A	1/10W 1K [M]
R720	ERJ6GEY0R00A	1/10W 0.00 [M]
R721	ERJ6GEYJ101V	1/10W 100 [M]
R722	ERJ6GEYJ563V	1/10W 56K [M]
R723	ERJ6GEYJ182V	1/10W 1.8K [M]
R724	ERJ6GEYJ333V	1/10W 33K [M]
R725	ERJ6GEYJ472V	1/10W 4.7K [M]

Ref. No.	Part No.	Values & Remarks
R726	ERJ6GEYJ473V	1/10W 47K [M]
R727	ERJ6GEYJ822V	1/10W 8.2K [M]
R728	ERJ6GEYJ103V	1/10W 10K [M]
R731	ERJ6GEYJ822V	1/10W 8.2K [M]
R735, 736	ERJ6GEYJ101V	1/10W 100 [M]
R744	ERJ6GEYJ103V	1/10W 10K [M]
R745	ERJ6GEYJ155V	1/10W 1.5M [M]
R748	ERJ6GEYJ182V	1/10W 1.8K [M]
R749	ERJ6GEYJ682V	1/10W 6.8K [M]
R750, 751	ERJ6GEYJ473V	1/10W 47K [M]
R752	ERJ8GEYJ220V	1/8W 22 [M]
R770, 771	ERJ6GEYJ155V	1/10W 1.5M [M]
R772	ERJ6GEYJ273V	1/10W 27K [M]
RJ701-709	ERJ8GEY0R00A	1/8W 0.00 [M]
RJ714-717	ERJ8GEY0R00A	1/8W 0.00 [M]
RJ721-724	ERJ6GEY0R00A	1/10W 0.00 [M]
RJ726-731	ERJ6GEY0R00A	1/10W 0.00 [M]
		TEST JUMPER
TJ701, 702	EYF8CU	[M]
		CAPACITORS
C1	ECUV1E473ZFV	25V 0.047U [M]
C2, 3	ECUVNE104KBN	0.1U [M]
C4, 5	ECUV1H681KBV	50V 680P [M]
C701	ECEA0JKA330I	6.3V 33U [M]
C702	ECUZNE104MBN	25V 0.1U [M]
C703	ECEA0JKA101I	6.3V 100U [M]
C704, 705	ECUZNE104MBN	25V 0.1U [M]
C706	ECUV1H272KBN	50V 2700P [M]
C707	ECUV1E273KBN	25V 0.027U [M]
C708	ECUE1H472KBN	50V 4700P [M]
C709	ECUE1C473KBN	16V 0.047U [M]
C710	ECUV1H182KBN	50V 1800P [M]
C711, 712	ECUWNE104ZFN	25V 0.1U [M]
C713	ECUV1C104MBM	16V 0.1U [M]
C714	ECEA0JKA101I	6.3V 100U [M]
C716	ECUE1H561KBN	50V 560P [M]
C717	ECUWNE104ZFN	25V 0.1U [M]
C718	ECUVNC224KBN	16V 0.22U [M]
C721, 722	ECUV1H100DCN	50V 10P [M]
C723	ECEA1AKA221I	10V 220U [M]
C724	ECUV1C104MBM	16V 0.1U [M]
C725, 726	ECUE1H102KBN	50V 1000P [M]
C727, 728	ECEA1HPK010I	50V 1U [M]
C730	ECUWNE104ZFN	25V 0.1U [M]
C731, 732	ECEA0JKA221I	6.3V 220U [M]

Ref. No.	Part No.	Values & Remarks
C733	ECUZNE104MBN	25V 220U [M]
C734	ECEA1AKA221I	10V 220U [M]
C735-737	ECUWNE104ZFN	25V 0.1U [M]
C738	ECUV1C154KBN	16V 0.15U [M]
C742	ECUV1E273KBN	25V 0.027U [M]
C743	ECUWNE104ZFN	25V 0.1U [M]
C744	ECUE1E822KBN	25V 8200P [M]
C745	ECUE1H102KBN	50V 1000P [M]
C747	ECUE1H222KBN	50V 2200P [M]
C748	ECUV1H471KBM	50V 470P [M]
C749	ECUZNE104MBN	25V 0.1U [M]
C750	ECUV1C104MBM	16V 0.1U [M]
C751	ECUZNE104MBN	50V 0.1U [M]
C752	ECUE1H152KBN	50V 1500P [M]
C753	ECUV1H471KBM	50V 470P [M]
C754	ECUE1H471KBN	50V 470P [M]

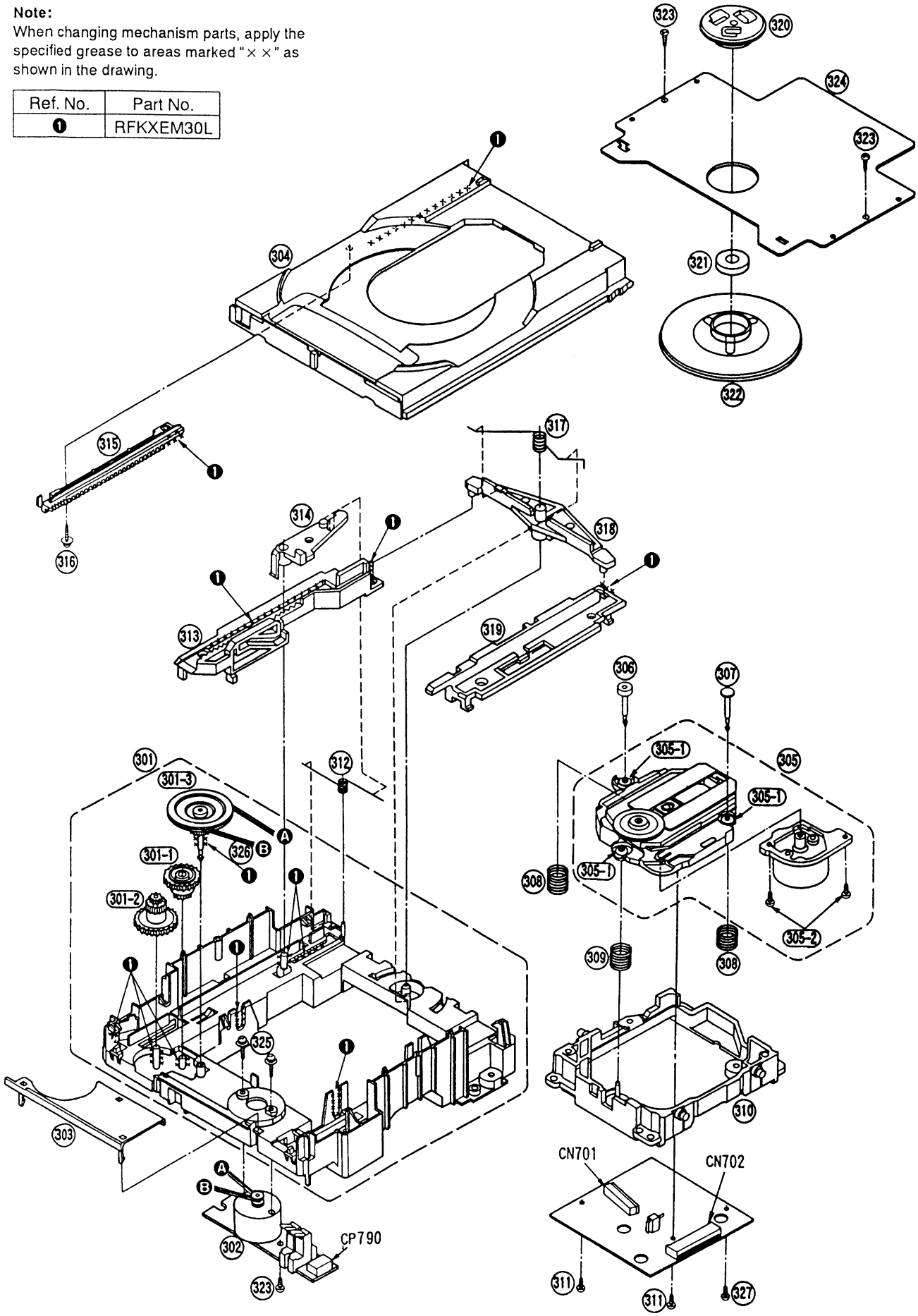
■ Cabinet Parts Location



■ Loading Mechanism Parts Location

Note:
When changing mechanism parts, apply the specified grease to areas marked "× ×" as shown in the drawing.

Ref. No.	Part No.
❶	RFKXEM30L



■ Replacement Parts List (Cabinet, Loading Mechanism and Jig/Tool)

Note: The reference number SA represent the grease and tool used for this unit.

Ref. No.	Part No.	Part Name & Description	Remarks
		CABINET PART(S)	
1	RHD30073-K	SCREW	[M]
2	RKMD327-S	CABINET	[M]
3	XTBS3+8JFZ1	SCREW	[M]
4	REZ0888	WIRE ASS'Y	[M]
5	RFKNLHD7MDAN	TRAY ORNAMENT ASS'Y	[M]
6	RFKGLHD50EN	FRONT PANEL ASS'Y	[M]
7	RKA0076-N	FOOT	[M]
8	RMN0382	SPACER	[M]
9	XTB3+6G	SCREW	[M]
10	RMR0502	SPACER	[M]
11	RGL0335-1Q	LENS	[M]
12	XQN26+AJ6FZ	SCREW	[M]
13	RFKNLHD7NB	BUTTON, OPEN/CLOSE	[M]
14	RFKNLHD7NC	BUTTON, PLAY/STOP	[M]
15	RFKNLHD7ND	BUTTON, RDM/REP/REC	[M]
16	XTBS26+8J	SCREW	[M]
17	SHE170-2	SPACER	[M]
18	XTB3+12JFZ	SCREW	[M]
19	XTB3+18JFZ	SCREW	[M]
20	RGKD817-M	ORNAMENT 2 (L)	[M]
21	RGKD818-M	ORNAMENT 2 (R)	[M]
22	REXD844	WIRE ASS'Y	[M]
23	REZ0887	FFC	[M]
24	RGKD819-N	ORNAMENT 1 (L)	[M]
25	RGKD820-N	ORNAMENT 1 (R)	[M]
26	RMKD324A	CHASSIS	[M]
27	RGR0243A-E	REAR PANEL	[M]
		LOADING MECHANISM	
301	RFKJXDT07-K	ROADING CHASSIS ASS'YL	[M]
301-1	RDG0142	GEAR	[M]
301-2	RDG0193	GEAR	[M]
301-3	RDP0065	PULLEY	[M]
302	REMD019	LOADING MOTOR ASS'Y	[M]
303	RMKD255	BELT COVER	[M]
304	RGQ0144-K	DISC TRAY	[M]
305⚠	RAE0150Z	TRAVERSE DECK	[M]
305-1	SHGD113-1	RUBBER	[M]
305-2	SNSD38	SCREW	[M]
306	RMS0350	PIN (A)	[M]
307	RMS0123-1	PIN (B)	[M]
308	RME0109	SPRING (A)	[M]
309	RME0142	SPRING (B)	[M]
310	RMR0698-K	TRAVERSE CHASSIS	[M]
311	XTV2+6G	SCREW	[M]
312	RME0063	SPRING	[M]
313	RMMD079-1	SLIDE PLATE	[M]
314	RML0178-1	LEVER	[M]

Ref. No.	Part No.	Part Name & Description	Remarks
315	RFKNLPG440-K	GEAR ASS'Y	[M]
316	RHD20009-1	SCREW	[M]
317	RME0087	SPRING	[M]
318	RML0349	LEVER	[M]
319	RMMD059-1	SLIDE PLATE	[M]
320	RMR0334	HOLDER	[M]
321	RHM245ZA	MAGNET	[M]
322	RXQ0380	MAGNET HOLDER	[M]
323	XTN26+6G	SCREW	[M]
324	RMA0793-1	CLAMPER	[M]
325	XYN2+F6FZ	SCREW	[M]
326	RMG0158	BELT	[M]
327	XTN2+6G	SCREW	[M]
		JIG/TOOL	
		TEST DISC	
SA1	SZZP1054C	TEST DISC	[M]
		GREASE	
SA2	RFKXEM30L	GREASE	[M]

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